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Longer Life
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Burnishing Cylinder



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OIL SEPARATORS with AUTOMATIC OIL RETURN


Write for bulletin on complete line covering refrigerating appliances, liquid line filters, dehydrators, acid neutralizers, standard parts and materials, service tools, shaft seals, bearing metals and parts. Descriptive literature will be gladly furnished on any or all of these lines on request.

AMERICAN INJECTOR COMPANY 1481-14th Street, Detroit, Mich.

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Attach to your letterhead and Mail for the 1936
KRAMER CATALOG ON REFRIGERATING EQUIPMENT
with B. T. U. Values and List Prices of all Coils at a glance, and short cuts in Engineering Commercial Applications.
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Refrigeration Instruments by Marsh






Gauges Thermometers Recorders Mercury Switches

Jas. P. Marsh Corporation
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Letters from Service Men

How to Handle the Bargain Hunter

Johnson's Radio Service
Corner D and Third
Lawton, Okla.

Feb. 10, 1936.

Publisher:

Just finished reading the Jan. 15 issue of REFRIGERATION NEWS and wish to say that if a dealer or salesman cannot get pepped up reading it, he has no business trying to sell refrigerators. I am selling Electrolux this year, but I like to keep posted on what my competitor has. Don't tell them I said so, but some of the lines presented have me half sold now. It may be due in part to my having just returned from a meeting and banquet. If just one-tenth of the pep and enthusiasm gained at a sales meeting, could be retained for three months, sales would increase several hundred per cent. We have all seen employers go back with plans for big things, only to get back into the old rut again, and then blame the salesman because of poor business.

The problem of trade-ins has more than a few dealers stumped, and I believe the trouble lies 100 per cent with them. Here is a gag worked in our town and hundreds of other towns.

The prospect goes in to see Jones and says: "Brown offered me \$25.00 for my old box. How much will you give?"

Jones says: "I'll give you \$35.00." The prospect goes to Brown, and back to Jones until he has them both giving away their profits.

It has been my experience that the dealer who makes a fair allowance to himself and customers and devotes his time to selling the merits of his merchandise, and does not knock his competitor, is the dealer who makes a profit in the end.

This is a condition brought on by depression and the sooner the dealer can say to the bargain hunter, "I am very sorry, I would like to give more, but this is the very best I can do," the sooner we will have more profits in the appliance business.

I have followed this plan in selling Zenith radios this year. I am working for a dealer now. You probably gather that I like Zenith. There are three dealers for an advertised line here and they started a cut-throat-big-trade-in-long-term racket, and the boss said:

"Well, looks like we better drop out until they get through fighting. Let's meet their prices and unload what we have."

I said, "If we do that we cheapen our merchandise. Let's sell the people on the idea that we have a radio that is better and give only what a trade-in is actually worth."

Believe it or not, we sold completely out of radios in less than 30 days and have several sold that we can't get, and so we are the only dealers making our full profits.

It is only human nature to want something you can't get, or you think you can't. Don't be independent to the point of "I don't care if you buy or not," but just enough to give Mr. Customer the idea that you are handling a good quality line and that you have a price which you will not change.

If I don't cut my price to get a deal, maybe my competitor will get it and a profit, and if he does not cut, maybe I can get a deal at a profit.

There should also be some way to prevent drug stores, filling stations, and such places from carrying refrigerators and radios as a side line. They invariably cut 10 to 30 per cent to make a sale and every such sale made, takes that much from a regular dealer. You and I can not buy an automobile wholesale, nor our groceries, but most everyone has a friend who can buy him a radio at cost.

I would like to help you read some of those pieces written for the home town paper, sent in by would-be reporters. If they read everything like those I once wrote, I don't envy you your job, but I think more people should write in.

I never had such a one, but I am not one to think the other fellow has a snap. After reading some articles I feel an urge to voice my sentiments but it seems like I don't have time. There are lots of evils in our present systems and if you need some slightly radical comments, I have a few in reserve. I quit a dollar-an-hour carpenter job two years ago for radio and refrigeration because I liked it, but if things don't pick up soon, I guess I will oil the old saw up again. "Thanks for listening."

CHANDICE JOHNSON.

Please add my name to your service mailing list for catalogs, etc. I am a subscriber to your NEWS.—M. L. Hull, 1100 W. Lexington Ave., Elkhart, Ind.

Twist the Valve Around

Rex Cole, Inc.
25-11 Hunters Point Ave.
Long Island City, N. Y.
March 14, 1936.

Editor:

Subject: Hints on Installation of Surge Tanks, Refrigerant Lines, Manifolds, and Valve Boxes.

Upon reading the article described under the above mentioned heading in the March 11 issue of the ELECTRIC REFRIGERATION NEWS we find that Figure 3, which shows a layout of the valve box containing three, 2-temperature valves, is inserted wrong and does not coincide with the caption noted below it.

We thought that a note of correction in your next issue might enlighten some puzzled readers.

J. L. ROTH,
Manager Service Department.

Answer: If puzzled readers of the article to which Mr. Roth alludes will turn page 13 of the March 11 issue upside down they will get the correct view of the valve box.

Seven Years' Service Experience

Heitzman Refrigerator Service
Any Make—Any Model
1010 So. H St., Richmond, Ind.

Editor:

Yes, I am a reader of your paper and have been for several years. So far I am not a subscriber as I work for several dealers that are and I never miss a paper. But as soon as I do miss one I will have to subscribe as I do not see how I could keep informed on refrigeration news without it.

I would be glad to have you list me in your independent service men's department. I have only had seven (7) years' experience on service work, but two of these were holding service schools on domestic refrigeration throughout the country.

I carry a Kelvinator card on commercial service and installation which was presented to me by E. A. Seibert of Kelvinator last year. My work here is mostly on the above and Crosley, Copeland, Frigidaire, Starr Freeze, and a few of all makes.

I would like to be placed also on your Catalog Mailing List.

HERMAN J. HEITZMAN.

Scott-Buttner Refrigeration Co., Ltd.
1656 Pine St., San Francisco
Wholesale Parts and Supplies
Service on All Makes

Gentlemen:

We would very much appreciate your placing us on your mailing list for catalogs.

R. F. WALTHER.

I am a subscriber to the ELECTRIC REFRIGERATION NEWS, and wish you would place my name on the list for the "Catalogue Mailing Service" for service men.—Louis Dusek, 55 Sawyer St., Hornell, N. Y.

As a reader of your paper I would appreciate your placing my name on your catalog mailing list.—J. F. Huff, Service Man, 917 So. Poplar St., Allentown, Pa.

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TUBE CUTTER
WITH STEEL ROLLERS
IN TUBE SUPPORT

Patents Pending



FOR HARD DRAWN COPPER PIPE

A tube cutter that's in a class by itself! Friction is reduced by the steel rollers. Very sturdy. Easy hand grip assures continuous feed of cutter wheel. Replaceable reamer and cutter wheel.

No. 10 for 3/16" to 3/8" o.d. inc....\$2.20
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HENRY VALVE CO.
1001-19 N. Spaulding Ave., Chicago, Ill.

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RANCOSTAT

Out in the field—that's where the real history of any product is made.

Field tests of thousands of Rancostats prove they are built right—for dependable operation thru long, hard service. Many years of pioneering and constant research are back of the leadership these field tests show.

The Stainless Steel Thermostat

The Automatic Reclosing Circuit Breaker Co.
Columbus, Ohio

Type X



DELIVER YOUR REFRIGERATORS ON RUBBER

The DAYTON CARRIER TRUCK
Will not mar — Speeds delivery

Type X - 53" long — Type Y - 70" long, both with 8 inch rubber tired wheels. Fitted with movable foot or with permanent wide foot for skirted bottom cabinets.

Type X with one strap and either foot - \$17.00
Type Y with one strap and either foot - \$18.50
f. o. b. Dayton

Write for Bulletin

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Dayton, Ohio 15 Park Row, N.Y.

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HEATING, REFRIGERATING AND AIR CONDITIONING CONTROLS
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Eight Models of Compressors
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from 1/6 H. P. to 15 H. P.
BRUNNER MANUFACTURING CO.
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This New 1936 Model Genuine SOUTH BEND LATHE
No down payment—3 years to pay. Write for details on this 9 in. x 3 ft. Workshop Precision, back-g geared, screw-cutting Lathe. Made in 8 different drives, 4 bed lengths, 88 practical attachments. Catalog Free!

Free WRITE FOR CATALOG 15

Weights 310 Lbs.—Crated
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\$75.00

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DETROIT, MICHIGAN, MARCH 25, 1936

Copyright, 1936, by
Business News Pub. Co.THREE DOLLARS PER YEAR
TEN CENTS PER COPY**5-Year Service Plan Optional On Conservador****Extended Guarantee on 'Pressure Imposing' Unit Costs \$5**

CHICAGO — Fairbanks-Morse has announced an optional 5-year warranty plan applicable to "C" and "E" line Conservador refrigerator models, by which the purchaser, through payment of an extra \$5, can obtain an extended service guarantee covering the pressure-imposing mechanism of the unit.

The new guarantee plan does not affect the standard first-year warranty. For service work on refrigerators sold with a five-year protection contract (other than that required during the first year), the factory has established a flat-rate reimbursement scale to compensate the dealer.

Gibson & Rice Lead Frigidaire Salesmen

DAYTON—James L. Gibson, salesman for the Pennsylvania Power Co., New Castle, Pa., is the new president of the Frigidaire B. T. U. club, organization composed of crack sellers of Frigidaire products, reports Frank R. Pierce, manager, household division, Frigidaire Corp.

J. Thomas Rice of the Ohio Edison Co., Akron, was elected vice president of the organization which is made up of men in the Frigidaire national selling force of more than 20,000 men who lead their associates in percentages of sales quotas attained.

Mr. Gibson, an experienced refrigeration salesman, first began selling Frigidaire on Feb. 15, 1935. By the end of the year, he had sold 303 household models and 17 commercial installations. He is 43 years old.

Mr. Rice was a restaurant operator who became interested in refrigeration when salesmen of the Ohio Edison staff held a party in his establishment to celebrate shattering of a quota. He joined them on Jan. 15, 1935 and at the close of the year had sold 404 household units. On the last day of the

F-M Joins Refrigeration Division of Nema

NEW YORK CITY — Fairbanks-Morse has joined the Household Refrigeration Division of National Electrical Manufacturers Association, it was announced following a recent meeting of the Nema Refrigeration Division here.

W. Paul Jones, manager of the home appliance division of the Fairbanks-Morse Co., will be the company's representative in Nema.

A representative of the Federal Housing Administration spoke at the recent Refrigeration Division meeting on the problem of the refrigerators which the government has repossessed under the insured loan provisions of Title 1 of the National Housing Act.

The FHA representative did not indicate that any change is contemplated at this time in the current set-up whereby manufacturers are given first chance to bid on repossessed models of their make to prevent the units being "dumped" on the market.

Fresno Dealers Protest Long Warranties, Claim They Are Costly and Irritating

FRESNO, Calif.—Terming long warranties on electric refrigerators an "irritating and costly practice," members of the Fresno Electric Appliance Society have written a letter to the Refrigeration Division of National Electrical Manufacturers Association (Nema) protesting against the current trend of extension of guarantees.

The letter which the local refrigerator dealer group sent Nema reads: "For some years past it has been the policy of refrigerator manufacturers to increase the length of guarantee on their product. Experience has proven that whatever one does,

Kelvinator Splits Franchises on Commercial

DETROIT—To obtain greater distribution of its commercial refrigeration equipment, Kelvinator Corp. has split up its commercial distributorship plan into four general franchises, covering (1) standard commercial, (2) beverage and liquid cooling, (3) air conditioning and room coolers, and (4) automatic heating equipment.

Several new commercial distributors in New York City, Chicago, Texas, and Ohio-Indiana territory have been signed under the plan.

Kelvinator has also completed arrangements with Peerless Ice Machine Co., Chicago, for Peerless to manufacture all its commercial cooling units, with the exception of forced convection units and air-conditioning low sides.

This action was taken to provide increased facilities for the production of other Kelvinator commercial equipment.

In addition to the increased distribution it makes possible, the new commercial franchise plan also provides for flexibility by permitting the distributor to sign a franchise in his territory for as wide or narrow a range of equipment as he wishes to sell.

This may cover the entire line of Kelvinator commercial products, or may be limited to any particular group or groups.

In other words, in signing a commercial franchise under the plan the distributor contracts to handle only those products he wishes to sell, or those products which in the opinion of the company he is equipped to handle efficiently. If a distributor wishes to concentrate his efforts on the liquid cooling or beverage cooler market, he signs a franchise for that equipment only; if he wants to handle automatic heating equipment exclusively, he is franchised in that field.

The plan separates household and commercial refrigeration; if a distributor wishes to concentrate on domestic equipment, he need not sign a commercial franchise. He may handle both, however. The plan is being used in franchising new distributors, and does not affect present distributor setups, it was explained.

In explaining the arrangement with

Six Porcelain Models Are Added to 1936 Line by Crosley

CINCINNATI—Crosley Radio Corp. has added six new all-porcelain models to its 1936 electric refrigerator line. The three new cabinet sizes of 5, 6, and 7-cu. ft. capacities come in two series, the PGKQ series, which is provided with the open-type compressor and the PGKT series with the new Crosley hermetically sealed compressor.

Although the cabinets in the two series are the same, the unit differences account for the price variation.

List prices of the new models are: PGKT-70, \$244.95; PGKT-60, \$219.95; PGKT-50, \$202.45; PGKQ-70, \$224.95; PGKQ-60, \$199.95; and PGKQ-50, \$181.45.

The five-year protection plan recently announced by Crosley will be effective on the new models at the regular \$5 addition to the list prices, declares H. E. Richardson, general sales manager.

others can duplicate. The tendency toward long guarantees is no exception. This practice only serves to confuse the public and increase the service costs of the dealer.

"We, therefore, as refrigerator dealers and members of the Fresno Electric Appliance Society, have gone on record as being definitely opposed to any guarantee in excess of one year and hereby register our protest to you and ask that immediate steps be taken to correct this irritating and costly practice.

WILLIAM TURPIN, President
Fresno Electric Appliance Society"

Results of University Tests on Refrigerators Appear in This Issue

Complete results of the tests on household refrigerator performance conducted by the Electrical Standards Laboratory of the University of Wisconsin, probably the most comprehensive tests of this type ever attempted, are published on pages 14, 15, 16, and 17 of this issue.

Ten makes of electric refrigerators and one gas refrigerator were tested and data taken on current (or gas) consumption, percentage of running time, temperatures maintained in the top and bottom of the cabinet, frost accumulation on evaporators, decrease in insulation efficiency, noise, condition of exterior finish, and motor heating.

After the initial tests were made the refrigerators were operated over a two and one-half months' period, and then tested again, to determine if there had been any loss in efficiency.

As most of the machines tested were 1934 models the tests do not give a true picture of the relative operating economy and efficiency of the models which are being marketed today; but the tests do present some of the first authoritative data ever obtained on operating costs, and the factors which tend to decrease the efficiency of a refrigerator.

Philadelphia Dealers Open Annual Show

PHILADELPHIA—"Electric Refrigeration Saves" will be the theme of the eighth annual electric refrigeration campaign sponsored by the Electrical Association of Philadelphia which opened here March 19 and continues for 15 weeks until June 26.

A prospectus issued by the association sets the refrigeration show which is being held this week in the Edison Building as the official opening of the drive. An estimated \$25,000 will be spent on the sales drive.

Newspaper advertisements, street car dash board signs, and outdoor posters are included in the extensive advertising program outlined.

Foreign-language papers and foreign-language radio broadcasts will be used for a larger percentage of the advertising than ever before in an attempt to get to part of the group of 200,000 customers of the power company who are now served at a loss because of low current consumption.

The campaign slogan was adopted after a survey of distributors revealed

Hearing on Revisions of N.Y. Code to Be Apr. 1

NEW YORK CITY—A hearing on the proposed revision of the New York City ordinance relating to refrigerating and air-conditioning systems will be held starting at 10 a.m. April 1 in room 1013 of the Municipal building, according to an announcement made last week by Deputy Fire Commissioner Francis X. Giaccone.

Several revisions were made in the ordinance following hearings in December, 1935 and the early part of this year. It is expected that much of the discussion at the hearing will be on the new revisions.

One of the most important revisions liberalizes the provision under which a system using a brine cooled by a flammable or irritant refrigerant can be used in the air-conditioning system for a residence, business or public building.

The code formerly provided that such systems could be used only if they were of the double indirect closed surface type, or double indirect open spray type. Now it is provided that if such systems are external to the

Refrigerator Financing Not Included in New FHA Bill**G-E to Open Spring Drive with Radio Sales Meeting**

NEW YORK CITY—A "radio sales meeting" of its distributors, dealers, and salesmen, with the general buying public as listeners-in, will officially open General Electric Co.'s spring selling season on Monday, March 30.

The one-hour broadcast, starting at 11 a.m., eastern standard time, will be heard by the world-wide sales organization of General Electric. In addition to the 63 stations of NBC's red network and supplementary stations, the program will be sent out over short wave, and all offices of the International General Electric Co. throughout the world have arranged to tie in with the program. The general public, too, is invited to listen in to this unique sales meeting.

Brief addresses will be delivered by Gerard Swope, president of General Electric Co.; Dr. W. D. Coolidge, of the company's famous "House of Magic"; Charles E. Wilson, vice president; and P. B. Zimmerman, general

(Concluded on Page 2, Column 2)

Kitchen Plan Will Be Discussed at Edison Sales Conference

CHICAGO—Present-day merchandising and cooperative programs that build domestic and commercial loads for power companies will be outlined at the Third Annual National Sales Conference of the Edison Electric Institute, which will be held this Wednesday and Thursday, March 25-26, at the Edgewater Beach hotel here.

Cooperative programs which are national in scope will occupy the spotlight at the opening session Wednesday morning. George Whitwell, chairman of the National Kitchen Modernizing Bureau, will tell how his program has been set in motion.

Air conditioning will have a prominent spot on the Wednesday afternoon program, with C. E. Michel, vice president of the Union Electric Light & Power Co., talking about the market, and L. R. Boulware, vice president of Carrier Engineering Corp., explaining the sales approach.

Major appliance selling activities will be aired Thursday morning, with such speakers as C. E. Wilson, vice president of the General Electric Co.; Reese Mills, manager of range sales for Westinghouse Electric & Mfg. Co.; C. A. Collier, vice president, Georgia

(Concluded on Page 2, Column 4)

Bush Production Not Affected by Flood

HARTFORD, Conn.—Flood conditions in Hartford have not affected production in the plant of Bush Mfg. Co. here, reports C. T. Bappler, sales and advertising manager of the company.

Shipments to customers are being made as usual, Mr. Bappler says.

Specifications of Household Electric Refrigerators to Appear Soon

In one of the April issues of ELECTRIC REFRIGERATION NEWS will be published comparative specifications for all models of all leading makes of household electric refrigerators.

The exact date of the issue is not yet ready for announcement, as the editors are determined to make every effort to get complete specifications information on every make.

Questions which the manufacturers are being asked to answer are shown on page 23 of this issue.

This is the fifth year that ELECTRIC REFRIGERATION NEWS has been publishing complete specifications of household electric refrigerators, and each year the demand for extra copies of the Specifications Issue has mounted, and each year the entire available

Appliance Financing Is Eliminated in Senate Committee Report

WASHINGTON, D. C., March 23—Chances for an extension of FHA financing of household refrigerator sales beyond April 1 grew slimmer today when the Senate Banking and Currency Committee reported out a bill recommending extension of Title 1 of the National Housing Act to Dec. 31, but eliminating refrigerators and similar appliances from the insured loan provisions.

The bill as reported out of the committee hearings also reduces from \$50,000 to \$25,000 the limit on insured loans for industrial and business repair and modernization purposes.

Upon passage by both houses the bill will be referred to a conference committee comprised of members of both houses to iron out any differences between the bills as they are passed by the respective houses.

6 Models Included in Mayflower Line

LIMA, Ohio—Mayflower, Inc., manufacturer of Mayflower electric refrigerators, has on the market for 1936 a line of six household units in four sizes, ranging from 4.3 to 8-cu. ft. net storage capacity.

Four of the models are finished in Dulux, and the two largest units are also available with porcelain exterior finish, if desired. All are covered by Mayflower's standard one-year warranty.

Cabinets on this year's Mayflower line, made by Midwest Stamping & Enameling Co., Morrison, Ill., have streamlined contours, with black trim around the top panel and ebony base, set on legs 6 inches above the floor for easy cleaning. Front of the cabinet is paneled in an attractive design, the Mayflower crest being centered high on the door. The cabinets have all-steel frames, and are insulated with Balsam Wool.

Brass chrome-plated hardware is used throughout the line, with the new door latch of improved design, positive in action.

Interior of the food compartment is all-porcelain, the bottom liner being specially treated for acid-resistance. The cooling unit is also all-porcelain, easy to clean, and centered in the cabinet interior. Cold control has nine freezing speeds, with wide-range defrosting. Shelves are of hot tin-dipped heavy wire.

With the exception of the smallest

(Concluded on Page 2, Column 4)

Cohen Heads S-W Sales in Washington, D.C.

WASHINGTON, D. C.—John F. Ditzel, radio and refrigeration sales manager for Stewart-Warner Corp., has announced the appointment of Stewart-Warner Distributors, Inc., Washington, D. C., to distribute both Stewart-Warner radios and refrigerators. William Cohen is president and treasurer of the new corporation and will direct sales activities. (See picture on page 5.)

supply has been sold out. Thus, readers who wish extra copies of this issue, are advised to send in their orders (with remittance) at once.

Because of the expense of publishing this issue, and the clerical work involved in handling extra copy orders, it will be necessary to charge 25 cents per copy for the Specifications Issue. This rate will apply to all quantities.

Twenty-five cent coin cards will be provided for distribution among dealer and distributor organizations, so that papers may be mailed directly to individual addresses, if desired.

In ordering, extra copies, please send check, cash, or stamps with order.

'Electric Refrigeration Saves' Is Theme Of Philadelphia Cooperative Drive

(Concluded from Page 1, Column 3)
a strong belief that the outstanding appeal for greater sales was "economy."

"Electric Refrigeration Saves" will not confine itself to the economy-in-expenditures theme, however, the prospectus explains. Newspaper advertisements will develop a series in which savings in food, health, time, work, and worry are emphasized.

Samples of these advertisements, contained in the outline, give the names of co-operating makes of electric refrigerators, and also cover three items chosen as important. To cover the replacement market, the first item mentioned is to stress the advantages of the modern electric refrigerator. Attention is then called to "pure ice cubes at all times"; and finally the reader is directed to the dealer who will demonstrate the advantages of electric refrigeration.

Beginning last Friday before the opening of the show and continuing throughout this week, more than 500 street cars will carry signs heralding the show. Again, for the week of April 20, the same number of street cars will have advertisements reading "Electric Refrigeration Saves—See Your Dealer."

Outdoor posters will also emphasize the slogan and the show dates.

A limerick contest with electric refrigerators as prizes is another feature of the show. Four hundred line ads in Philadelphia papers will give the conditions of the contest, and specify that all limericks must be delivered personally at a desk provided on the show floor in order to qualify. Names of co-operating companies will be mentioned in all these advertisements.

Simultaneously with the Phila-

delphia show, the Fifth Annual Electric Refrigeration Show of Chester is being held at Odd Fellows' Temple, Eighth and Sprout Sts. Dates for a four-day show in Pottstown have not yet been set.

Sponsors for the campaign are: Coldspot, Crosley, Frigidaire, General Electric, Grunow, Hotpoint, Kelvinator, Leonard, Norge, Sparton, Stewart-Warner, and Westinghouse.

G-E Executives to Open Spring Campaign with Radio Meeting

(Concluded from Page 1, Column 4)
sales manager of the company's appliance and merchandise department.

Interspersed on the program will be numbers by Richard Bonelli, leading baritone of the Metropolitan Opera, and selections by the General Electric orchestra, and G. E. male chorus, the G-E women's chorus and the "Six Singing Violins."

Thirteen hundred dealers and salesmen will be in the audience at the NBC studios in New York during the broadcast, while salesmen and dealers in other sections will gather in leading cities throughout the country—and in foreign countries—to listen to the program.

The broadcast will mark the opening of the company's spring sales activity on electric home appliances. Immediately following this "sales meeting of the air," distributors in various sections of the country will continue with their local sales conferences. At these local meetings,

several motion pictures will be shown and new models of refrigerators, ranges, and other kitchen and laundry equipment will be displayed.

The program, known as the "Hour of Ours," was planned for March 30 so that the company's "Spring Refrigeration Sweepstakes Sales Campaign" could be started with the greatest amount of enthusiasm on the following day, April 1. One motion picture will deal with the campaign and the recent outings of the "G-E Toppers," organization of top-notch salesmen. Another film has been made by Richard C. Borden and Alvin C. Busse of New York University, nationally known sales counselors.

Hours set for the broadcast are: 11 a.m. to 12 noon, eastern standard time; 10 to 11 a.m., central standard time; 9 to 10 a.m., mountain standard; and 8 to 9 a.m., Pacific time.

Many distributors have arranged for the use of theaters and hotel ballrooms, where their dealers and salesmen will gather to listen to the broadcast.

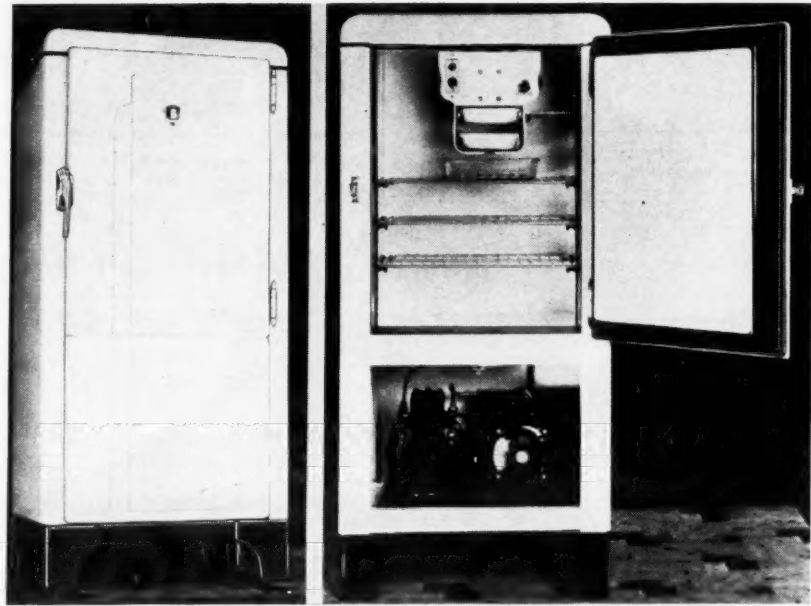
The addresses of General Electric officials, as well as the musical program, will be of interest to the general public. Distributors and dealers are urging their friends, customers, and others to listen to the program.

Sears Roebuck Refrigeration Executive Dies

CHICAGO—Clarence J. Camp, of the refrigeration division of Sears Roebuck & Co. here died at his home recently following an attack of pneumonia.

Mr. Camp was associated with the electric refrigeration industry for more than 16 years. He was first connected with the McCray Refrigerator Corp.'s Detroit Office and later worked for Frigidaire Corp. in both the Detroit and Los Angeles branches.

The Mayflower—1936 Style



| Model No. | Storage Capacity Cu. Ft. | Shelf Area Sq. Ft. | No. of Ice Trays | No. of Cubes | Lbs. of Ice | Exterior Dimensions Height Width Depth |
|-----------|--------------------------|--------------------|------------------|--------------|-------------|--|
| G-46 | 4.3 | 9.7 | 2 | 56 | 4 3/4 | 52 1/2 24 1/2 21 1/2 |
| G-56 | 5.5 | 12.1 | 2 | 56 | 4 3/4 | 56 1/2 26 1/2 21 1/2 |
| G-66 | 6.4 | 13.4 | 3 | 84 | 7 1/4 | 58 1/2 29 21 1/2 |
| G-86 | 8.0 | 14.75 | 4 | 112 | 9 1/2 | 63 31 1/4 22 1/2 |

Models GP-66 and GP-86 are the same as models G-66 and G-86, except that they have porcelain exteriors. All other models have exterior finishes of Dulux. Interior (all models) is porcelain.

Six Models Included in Mayflower Line

(Concluded from Page 1, Column 5)
model, all units in the line are equipped with a rubber free cube tray, for quick ice cube delivery, and automatic interior electric light. Second largest model has, in addition, a vegetable crisper, and the largest has two crispers and a four-piece crystal set.

The two all-porcelain models have the same equipment as the large Dulux unit.

Powering the units is Mayflower's standard compressor, similar in design to Mayflower units of past years. The motor cradle is mounted in rubber to insure quiet and efficient operation. Single-cylinder compressors, driven by 1/4-hp. motors are used in the three smallest models; the largest model uses a twin-cylinder unit, driven by a 1/2-hp. motor.

Smallest model in the line, G-46, has a storage capacity of 4.3 cu. ft. and

a shelf area of 9.7 sq. ft. It has two ice trays and one fast freezing shelf, and ice cube capacity of 56 cubes or 4 3/4 lbs. per freezing.

Model G-56 has a capacity of 5.5 cu. ft. and a shelf area of 12.1 sq. ft. Its ice cube capacity is the same as Model G-46.

Model G-66 is a unit of 6.4-cu. ft. capacity and 13.4-sq. ft. shelf area. It has three shelves, two of them for fast freezing, and can turn out 84 ice cubes, or 7 1/4 lbs. of ice, at a freezing.

Largest size, Model G-86, has a capacity of 8 cu. ft. and 14.75 sq. ft. of shelf area. It has four ice tray shelves, two for fast freezing, and turns out 112 cubes, or 9 1/2 lbs. of ice, at a freezing.

The porcelain-finished models, known as GP-66 and GP-86 in the line, are the same in specifications as the two largest units of the standard series, except for their exteriors.

Cooperative Selling to Be Discussed at Edison Institute Sales Conference in Chicago

(Concluded from Page 1, Column 4)
Power Co.; R. C. McFadden, new business manager, Southern California Edison Co.; and Dr. G. W. Allison of the institute.

Program for the conference is as follows:

Wednesday Morning Session:

"The Sales Challenge of Today"—E. W. Lloyd, vice president, Commonwealth Edison Co.

Symposium on national cooperative programs—

(1) "The Kitchen Modernizing Program Is in Motion"—G. E. Whitwell, vice president, Philadelphia Electric Co.

(2) "New Ventures in Better Light—Better Sight"—M. E. Skinner, assistant vice president, Niagara Hudson Power Corp.

(3) "Electrical Housewares Promotion Expands"—H. P. J. Steinmetz, general sales manager, Public Service Electric & Gas Co.

(4) "The Third Year of Running Water Program"—P. H. Powers, vice president, West Penn Power Co.

"The Contractor and the Utility"—Earl N. Peak, president, National Electrical Contractors Association.

Speakers at the formal luncheon will be Bernard F. Weadock, vice president and managing director, Edison Electric Institute, who will talk on "Some Legal and Political Aspects of the Utility Industry," and W. W. Freeman, vice president, Columbia Gas & Electric Corp., who will discuss "Observations on the Government's Rural Electrification Program."

Wednesday Afternoon Session:

"Standardized Light Prescribing Technique—Its Possibilities"—Earl L.

Canfield, president, Sight Light Corp. "Our Air-Conditioning Market"—C. E. Michel, vice president, Union Electric Light & Power Co.

"Sales Approach to the Air-Conditioning Market"—L. R. Boulware, vice president, Carrier Engineering Corp.

"The Status of Industrial Power Development"—H. C. Webb, Jr., commercial manager, Virginia Electric & Power Co.

Thursday Morning Session:

"The Electric Range Market, Today and Tomorrow"—Reese Mills, Westinghouse Electric & Mfg. Co.

"Intensified Selling in the Low Income Groups"—C. A. Collier, vice president, Georgia Power Co.

"New Approaches to the Sale of Electrical Equipment"—C. E. Wilson, vice president, General Electric Co.

"Business Development in California"—R. C. McFadden, new business manager, Southern California Edison Co., Ltd.

"Commercial Progress Viewed from the Field"—Dr. G. W. Allison, Edison Electric Institute.

Front Co., Wheeling, to Sell S-W Products

WHEELING, W. Va.—The Front Co., electric supplies and equipment distributor of this city, has been appointed distributor for Stewart-Warner refrigerators and radios.

S. S. Front is president of the company, and A. K. Clifford is general sales manager.

Crosley Shows Sales Gains In South and East

CINCINNATI — Distributors' sales reflect unusual refrigeration activity, early consumer buying, and decided business gains in the New England and southern states, reports H. E. Richardson, general sales manager of Crosley Radio Corp., on his return from a two-and-a-half-weeks' trip through those states.

Lincoln Sales Co., Baltimore distributor, showed more than a 100% increase in sales, according to Mr. Richardson, and in Washington, one dealer in the territory of Simons Distributing Co., new distributor, sold 75 refrigerators in a 10-day period.

Your SPARTON Opportunity for 1936

Exclusively SPARTON

Profit with SPARTON . . . the only Refrigerator that is 100% AUTOMATIC

These big, important, practical features will increase your sales.

ANTIFROST CLOCK
FIVE YEAR WARRANTY
BASKADOR
VEGABIN
BASKADRAWER

● Sparton's exclusive antifrost electric clock, which automatically defrosts the cooling unit daily, assures perfect air circulation, even temperature, positive food protection and no waste in electricity. In addition, it acts as an accurate, dependable electric kitchen clock. With the Baskador, Vegabin, Baskador, together with advanced styling and advanced engineering, the antifrost clock is your customers' guarantee of up-to-date refrigeration and complete satisfaction. It's your assurance of a great sales opportunity that is making big money for Sparton dealers. Now is the time for action. Write or wire The Sparks-Withington Company, Jackson, Michigan. Sparton of Canada, Ltd., London, Ontario.

❖ COLD AND SILENT AS A WINTER NIGHT ❖

Leading Frigidaire Salesmen for 1935 Are Selected

(Concluded from Page 1, Column 1)
year, he sold eleven refrigerators. He is 38 years old.

The eight members of the B. T. U. club cabinet, next ranking members of the sales organization, are: Cecil E. Kirby, Miami, Fla.; G. A. Larriva, Tucson, Ariz.; W. R. Daniel, Jacksonville, Fla.; Frank S. James, Los Angeles; R. M. Smoak, Tampa, Fla.; Tom Tabor, Spokane, Wash.; A. H. Tarr, Chattanooga, Tenn.; A. M. Lambessy, Houston, Tex.

Sales leaders who lead their respective Frigidaire distribution districts and thereby earned extraordinary recognition for achievement are:

Akron district: G. P. Tschumi, F. R. Mannweiler; Albany district: F. B. Chapman, Charles H. Briggs, Charles Playford; Baltimore-Washington district: J. R. Enright, A. W. Friend, E. J. Brosseau; Atlanta district: A. Jesse Winegar, Herbert Bradshaw, W. R. Mabry, Sam E. Brown, R. P. Aldrich.

Billings district: R. J. Barber, Guy S. Winters, E. W. Johns; Buffalo district: George W. Fulks, Harry B. Watson, Elmer Adelman; Chattanooga district: D. E. D'Armond, K. W. Northern, F. W. Macrea; Chicago district: B. R. Broadwell, E. C. Ruthardt, Lee Homebrook, J. F. D. Berchtold, A. R. Gustafson, H. R. Miller, Henry Marcus, R. E. Buckley, L. A. Goodale, G. W. Scott.

Cleveland and Dayton Leaders

Cleveland district: Jerry Bohinc, Jerry Antel, R. H. Nichols, E. F. Schmidt; Dayton district: Frank R. Bookmyer, J. J. Lahey, George Dell, J. T. Alexander, Jr., M. G. Hall, E. A. Parry.

Denver district: B. F. Hartney, L. E. Markham, F. W. McPhee; Detroit district: John Garner, J. H. Ryal, W. H. De Mattia, C. W. Bliss.

El Paso district: B. F. Hannah, V. L. Fulcher; Ft. Worth district: S. A. Dupriest, Riemer Calhoun, M. E. Sidebottom, Lake A. Barber, O. W. Aston, W. Crow.

Houston district: Randolph Reed, S. A. Fertitta; Indianapolis district: J. E. Byers, Arthur Patton, Edward McGinness.

Kansas City district: Leo P. LaFontaine, Frank R. Rice, George T. Perrine, R. L. Lewis.

Los Angeles district: C. S. Sampson, H. P. Willetts, T. B. Sexton, Carl Wilde; Memphis district: W. A. Afflick, G. A. Cromwell, Collins Kilgore.

Miami district: William O. Tuttle, I. H. Silverman; New Castle district: A. A. Snow, W. B. Haller.

New England district: C. J. Allen, G. H. Bloomberg, J. O. Hull, James F. Biggin, J. J. Brickman, Russell Sage, Joseph Bloom, Claude A. Gates, W. J. Dunne.

New Orleans district: E. E. Delaney, R. H. Ferguson, L. L. Butcher, W. H. Yost; New Jersey district: B. A. Seiple, C. R. Butcher, M. A. Kaminsky, H. G. Baker II, A. Aberbach.

New York City District

New York district: J. Rocco, O. H. Lyon, M. Eneman, J. Wanty, L. Titetsky, H. Matells, A. W. Gulliver, L. A. Duckworth, T. Campbell, Jr., D. J. Quinlan, C. F. Travis, Louis Sack.

Norfolk district: C. E. McCurry, K. L. Barr, Clem Goodman, Arthur Luttrell.

Oakland district: D. C. Poulsen, Paul Charron, G. H. Ferguson, T. F. Lofberg, A. E. Hamilton; Oklahoma City district: Harry Lieberman, R. H. Webster, Leon Rounds.

Omaha district: C. T. Koenigstein, F. W. McKenna, John Buchholz; Peoria district: F. L. Hazen, W. H. Makepeace, Joseph R. Gavin.

Philadelphia district: Sydney Arinsberg, W. J. Bredin, J. A. Waltersdorf, R. Bittner, J. L. Hosler, A. Jarvis, I. Wilson; Pittsburg district: J. W. Taylor, J. B. Connolly, J. H. Mullen, I. G. Katron, C. O. Campbell.

Portland district: D. B. Chown, Harold P. Kelley, R. N. Haverstick; Roanoke district: I. N. Fuqua, D. H. Cashwell, A. W. Cox.

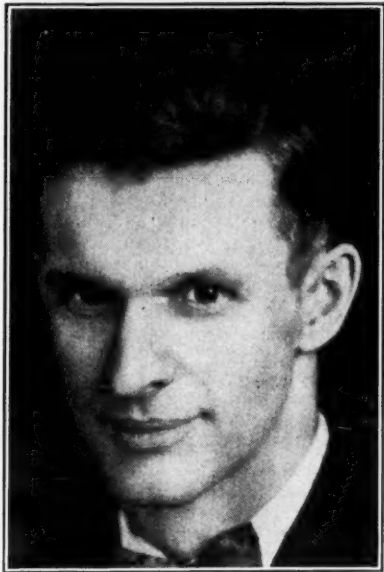
Rochester district: F. M. Houston, E. W. Ford, G. D. Doherty; St. Louis district: Julius Horwitz, C. E. Wildberger, H. Heineck, T. H. Vinyard; Salt Lake City district: Harold McKean, Floyd Williamson, George Detweiler.

San Antonio district: L. E. Minns, Ardis Colbert, J. T. Halsell, Jr.; Seattle district: Roosevelt Erickson, Sterling Cox, J. R. Daigleish; Sioux City district: George W. Roach, George M. Sharp, Robert R. Maurer, A. A. Rogers.

Spokane district: Leon G. Gray, Henry L. Bjorklund; Syracuse district: Howard Van Duzer, George Shelley, Sam J. Nyswonger, W. H. Allison.

Tampa district: Thomas L. Fulwood, H. I. Boggs, Jr.; Twin Cities district: F. D. Meyer, S. V. Lehman, Neil A. Gallagher; Wichita district: H. L. Graber, George F. Baldwin, O. L. Markham, L. D. Fisher.

Frigidaire B. T. U. Club Leaders



Top office holders in the B. T. U. Club, national Frigidaire salesmen's organization. Left to right: J. L. Gibson of Pennsylvania Power Co., New Castle, Pa., president; J. T. Rice, Ohio Edison Co., Akron, vice president.

Platt Reorganization Plans Submitted

LOS ANGELES — Reorganization plans for the Platt Music Co., local retail dealer, with branches here and in Hollywood, were recently submitted by the trustee, E. S. Steel, for the consideration of the creditors, debenture holders, and stockholders, and confirmed by Federal Judge Paul J. McCormick at a hearing held Monday, Feb. 17.

Confirmation by the court means

that the reorganization plans, which are expected to take the estate out of the court and make it a going concern, will now be made effective.

Under the terms of the plan, to which 90% of the creditors agreed in writing, general creditors and debenture holders will become preferred stockholders who will have full voting rights and control of the company, including its management.

Mr. Steel estimates that approximately 90 days will be needed to carry out the terms of the reorganization.

5 Refrigerators, Range, Washer, and 350 Recipe Books Sold by Distributor Following G-E Cooking Broadcast

COLUMBUS, Ohio.—Bard & Barger, Inc., General Electric distributor here, sold five refrigerators, a range, an electric washing machine and 350 recipe books as a result of a recent promotional activity—a cooking school broadcast—which it sponsored in a tie-in with radio station WBNS.

Approximately 3,000 persons attended the two-hour "homemakers party" which was broadcast from the stage of the RKO Palace Theatre March 4. Miss Edwina Nolan, home service director of the General Electric Co., assisted Miss Ella Mae Ives of the radio station in putting on the broadcast.

The distributor's part in the promotion was to supply the services of Miss Nolan, to construct a General Electric kitchen on the theatre stage for the cooking school broadcast, to furnish prizes, and to supply smocks for the ushers.

Chief prize given at the party was a G-E refrigerator. In connection with a "treasure hunt," a feature of the party designed to take the guests into the distributor's store following the broadcast, Bard & Barger also gave a G-E washer.

Tie-In with Radio School

Arranged through the instigation of the radio station as a tie in with the two 15-minute cooking schools which it broadcasts each day, the promotional activity involved a detailed publicity program for General Electric and for Bard & Barger.

The theater broadcast time was scheduled so that Miss Nolan had 30

minutes for her comments on the electrical appliances used in the demonstration, besides assisting Miss Ella May Ives in conducting the entire program.

In the two days immediately preceding the party, Miss Nolan gave four six to eight-minute broadcasts, and one 15-minute program, on G-E equipment.

Extensive Advertising Build-Up

Announcements of the cooking school demonstration, mentioning Bard & Barger participation, were broadcast twice daily over station WBNS over a two-week period.

The radio station also arranged to have a four-minute movie trailer building up the party run after each performance from Feb. 19 to March 4. The trailer, containing Miss Nolan's picture and two one-minute playlet films, was shown to over 35,000 persons.

Other publicity features arranged by the radio station included placement of the distributor's electric refrigeration display in the theatre lobby 12 days before the broadcast, and spot announcements in the columns of the *Columbus Dispatch*, a WBNS-owned newspaper.

WBNS also furnished programs, food, music, and admission tickets for the homemakers party.

General Electric dealers throughout central Ohio were urged by the distributor to invite prospects to their stores to hear the broadcast of the program, and to have miniature "homemakers parties" of their own.

COPELAND

These 2 Models

take the place of....

4 Competitive Models!




This 9.01 net cu. ft. Copeland model No. 936 will fit into any space that a competitive 8 cu. ft. model would occupy.

This 7.1 net cu. ft. Copeland model No. 736 will fit into any space that a competitive 6 cu. ft. model would occupy.

Think what

THIS MEANS IN SIMPLIFYING YOUR INVENTORY Problems!

Here is the Greatest "Profit-Making" Line of Refrigerators on the American Market!

Guaranteed to be Unexcelled in QUALITY - DESIGN and PERFORMANCE



Every food storage convenience feature that enthusiastic home managers want. Four-in-One Food File, with three lower drawer compartments, and sliding tray immediately above. Also upper removable tray that makes space available for watermelon, etc.

TRUSCON STEEL COMPANY

Refrigeration Sales Division

615 Wayne Street - Detroit, Mich.

- LOW PRICE
- EYE APPEAL
- PUBLIC ACCEPTANCE
- NATIONALLY KNOWN
- NATIONALLY ADVERTISED

YOU OWE IT TO YOURSELF TO INVESTIGATE COPELAND

Around the World

With George F. Taubeneck

THIS WEEK Editor George F. Taubeneck gives readers of the News a colorful story about the Hawaiian Islands and reports his interviews with a number of refrigeration distributors. Additional interviews will appear next week.

Mr. Taubeneck is due in Singapore on Saturday. He will spend several days in and about that famous port.

On April 2 he will take a BISN steamer from Singapore for Calcutta, India, making stops enroute at Penang and Rangoon. He will be in India 11 days, crossing to Bombay by train. Mail from the United States will reach Mr. Taubeneck at Bombay if sent via London with extra postage (22 cents per 1/2 ounce) for the air line to India. Send letters in care of Ahmed A. Fazalbhoy, New Queen's Road, Bombay, India.

On April 25 he will sail from Bombay on the *S. S. Moloja* stopping a few hours in Aden, Arabia, on April 29 and arriving in Port Said May 3. He will spend a week in and about Port Said including a trip to Palestine, where he will pick up mail addressed in care of Max A. Greenburg, British Thompson-Houston Co., Ltd., 26 Gruzenberg St., Tel Aviv, Palestine.

On May 10, he will sail from Port Said on the *S. S. Naldera*, stopping a few hours in Malta, May 13 and arriving in Marseilles on the morning of May 15. He will then go to Paris where he will receive mail addressed in care of Mr. H. A. Granary, Frigeco, S. A., 79 Avenue Des Champs Elysees.

On June 14 he will be in The Hague, Holland, to attend the International Congress of Refrigeration and deliver an address on "The Development of the American Household Electric Refrigeration Industry."

Honolulu

A good many of us have had this Hawaii business all wrong. After looking at pictures of moon-silvered palm trees, and listening to romantic music about this Paradise of the Pacific, we've come to think of Honolulu as a place to come to let our arteries soften, or to engage in a torrid romance with a dusky voluptuary in a grass skirt.

Mister, that's not what you'll find. Honolulu does enjoy a salubrious climate, but men don't come here to retire and bask in the sunshine; they move to Honolulu to get ahead in the world (if they're young), or get rich (if they're older).

Man after man you talk to in Honolulu (among the business leaders, that is) came to Hawaii as a mere stripling from the mainland because he was dissatisfied with the opportunities for youngsters. By conscientious application, he rose rapidly to a position of responsibility and power in Hawaii. And today, these same business executives will tell you that bright young men are at a premium in Hawaii, and that every firm they know is looking for some.

Honolulu's Stability

Why is Hawaii a land of opportunity? First of all, because the competition isn't so keen. Out-of-work men rarely come to Hawaii "on speculation." It costs too much to come over. And young men who do have the money generally have their eyes on some Main Chance at home.

Secondly, a great deal more money seems to flow into Hawaii than goes out. The land's chief support comes from the regular never-failing crops of sugar and pineapple. With very few exceptions, the plantations which supply these staples are home-owned, and the money paid them for their crops is largely reinvested in Hawaii.

Too, the army and navy forces located permanently in the Islands spend some 30 millions of dollars annually there. This money comes not from the Islands, but from the mainland.

Still another factor in making Honolulu a place of opportunity for young men is the stability of its institutions. Bank failures are as rare as native Hawaiians who dance the hula for their own amusement. Most of the business is controlled by exceedingly large houses which are family affairs, closely owned, operating conservatively, jealous of their good will, and exceptionally good to their employees. Men are rarely fired

except for gross incompetence. Normally they join one concern and stay with it the rest of their lives.

At the lowest point of the depression Honolulu had a total of only 6,000 unemployed—an all-time record! Truth of the matter is that the depression merely brushed light past the Islands. People still bought sugar and pineapples, so the Islands prospered pretty much as usual.

Most successful business men in Honolulu are comparatively wealthy. Most salaried individuals receive more income there than they could on the mainland in the same type of work. Most laborers live far better in the Islands than they could elsewhere.

According to my friend RILEY ALLEN (Kentucky born, University of Chicago educated, West Coast trained), no place else in the world do farmers, peasants, or agriculturists of any description earn as high an income as do the plantation workers of the Hawaiian Islands. Mr. Allen, who is editor of the *Honolulu Star-Bulletin*, has made an exhaustive statistical study of this situation to prove his point.

Mammoth Merchandisers

Refrigerator distributors in Honolulu are the chief business houses of the town. And such establishments! We venture to say that their financial statements would make any distributorship on the mainland look kinda two-by-fourish.

Most of them sell everything from automobiles and pianos to "native" tapa cloth covers (made in Samoa now) and picture postcards. Examples:

The von Hamm Young Co., which distributes Frigidaire equipment, operates downtown Honolulu's leading hotel (and night club) in the same huge building which houses its refrigeration activities.

The Theo. H. Davies Co., distributor for Electrolux household and Servel commercial refrigeration, advertised Caterpillar tractors and fancy groceries along with Electrolux in the first issue of the *Star-Bulletin*. And we went to the same concern next day to get our steamship ticket changed!

Oriental

More than 65% of the population of the Islands is Oriental—originally Japanese, Chinese, Filipino, Javanese. A large proportion of these are second and third generation, Island born, and American citizens.

Most of them did not come to Hawaii of their own accord, but were recruited for work on the sugar plantations when the owners were

desperately seeking labor. These importations of alien workmen have long since ceased.

Portuguese are there in considerable numbers—and, of course, Americans and Englishmen. Of the native Hawaiians, only some 30,000 are left (although the strain persists in many of the "mixtures" with other races). A negro is a curiosity.

Racial fusion is proceeding at a rapid rate. Inter-marriage between all the various races present occurs with great frequency. These inter-marriages are not fecund; which is one reason why Islanders expect the proportion of Orientals to "whites" to diminish rather than increase.

Of all these combinations, Honolulu business men agree that the finest is a child of mixed Hawaiian and Chinese parentage, who is usually good-natured, easily taught, highly intelligent, genuinely cooperative, and good looking.

Islanders have decidedly non-criminal tendencies; and organized crime is non-existent.

One reason that crime doesn't pay in Hawaii—an hence isn't much of a factor in the community life of cities like Honolulu and Hilo—is that apprehension of criminals is relatively easy. Hide-outs are scarce.

We were surprised one night to find out how easy it was to get a car which didn't belong to us out of a parking lot. We had to run an errand, and a friend told us to go over and borrow his car.

The attendant at the parking lot had never seen us before, nor had he been informed in advance about our mission; yet it took only a couple of sentences to sell him on letting us have the car. A bit concerned about this apparent laxity, we related the incident to the owner of the car.

"Why should they be concerned?" he shrugged. "Where could you take the car if you did steal it? Remember, this is an island, and you can't run very far away—not more than two hours from the police."

A still more important reason for the absence of crime is the character of living in the island paradise which furnished him richly with the necessities of life almost without him turning a hand have made the Hawaiian curiously unconvicted. He has everything he wants; why should he take away something from somebody else?

Nobody—unless entirely helpless—can starve in the Islands. Nobody ever dies of exposure. An abundance of wild-grown food, and an abundance of sunshine and warmth, have combined to make the Hawaiian exceptionally good-humored, happy, care-free, helpful, affectionate, and kind.

"The Hawaiians are the sweetest people on earth," is the way HAROLD W. BOYNTON, general manager of the Honolulu Gas Co., a former naval officer and world traveler, puts it.

Although there aren't more than 30,000 pure-strain native Hawaiians left in the islands, a vast proportion of the residents have some Hawaiian blood flowing through their veins.

And it is an interesting fact that this "sweetness" of the Hawaiians is apparently a dominant characteristic, for even those who are only one-eighth Hawaiian seem to exhibit it in a marked degree.

Socially the native Hawaiians are quite acceptable among the "whites" in the Islands. It is not at all uncommon for the son of a wealthy and aristocratic English or American family, residents of the Islands, to marry a Hawaiian girl; nor do the parents seem to frown upon the practice, for the elders who have been around for some time have observed that these girls make excellent wives, and that the marriages usually are happy.

The reverse—Hawaiian boy and aristocratic girl—is infrequent and not nearly so acceptable.

Dominant Thirty

As a matter of fact, Island aristocracy had its beginnings in judicious

mixed marriages—chiefly between men from England or New England and daughters of Hawaiian chieftains.

Some 30 families are said to dominate the business and social life of the Islands. These are the families who own the sugar and pineapple plantations, and who own and operate the big merchandising houses we have mentioned previously.

This aristocracy is predicated and founded on the possession of land. And how was this land acquired? By marrying the daughters of native landholders.

Shrewd Yankees or Britons (with names like Castle, Cook, Baldwin, Davies, and Dillingham), traded for more and more land until they had obtained vast estates. With this previously undeveloped property, they created great wealth in a century.

Possibly the strain of Hawaiian blood running through the veins of these families has made them more human and considerate of their workers than other controlling families seem to be. Nowhere else are living standards of all classes of laborers and wage-earners so high as in the Hawaiian Islands. The "ruling" families see to that.

Probably nowhere else in the world is there so good an example—or has there been—of a benevolent feudalism as exists in Hawaii today.

Not only do the unskilled laborers and the higher levels of salaried individuals enjoy better-than-normal living conditions, but the same situation holds true in the case of the top ranks of executives.

In Honolulu a ten-thousand-dollar-a-year man lives like a New Yorker with an income of fifty thousand (or, equivalently, a millionaire). We spent some time in the home of one such man. It was practically an estate, with rolling, gorgeously landscaped terrain, a lovely house, a small additional house for guests, three servants, three dogs, a tennis court, a dawn-on-the-ocean view on one side and a sunset-over-the-mountains scene on the other—and all only six minutes drive from his office!

Everything but Guns

A first-rate example of one of the big commercial houses which dominate Hawaiian merchandising activities is Theo. H. Davies & Co., Ltd., territorial distributor for Servel-Electrolux refrigeration equipment, McCray wall-type commercial refrigerators and display cases, Friedrich commercial refrigeration cabinets, Ward cold-storage doors, Brunswick-Balke-Collender beer-dispensing fixtures, Liquid Carbonic soda fountains, Detroit Lubricator expansion valves, Roessler & Hasslacher methyl chloride, Revere Copper & Brass tubing, Kerotest brass fittings—and everything else under the sun but guns.

You can walk for hours through departments devoted to rugs, sporting goods, house furnishings, objets d'art, native handicraft, wholesale foodstuffs, etc., etc., etc., and still not see all the establishment.

J. W. RUBENSON is the sales engineer in charge of refrigeration sales, reporting to GEORGE H. ANGUS, vice president and managing director of the hardware department, and GEORGE T. KLUEGEL, assistant manager of the hardware department.

Mr. Rubenson pushes Servel commercial refrigeration equipment and Friedrich cases especially hard, and claims to have sold more commercial jobs than anyone else in Honolulu. The market is far from saturated, however.

Up until quite recently the Davies company hasn't promoted the sale of Electrolux household refrigerators very seriously—gas rates have been too high. But this situation has been remedied, and rates are now in effect which are comparable to those quoted in most sections of the mainland.

Although the Davies company is the distributor, the Honolulu Gas Co. has actually sold the majority of Electrolux refrigerators on their lines—of which there are approximately 150 water-cooled jobs (which have given them trouble) and 100 air-cooled models (which have given no trouble).

Because of a rather unhappy experi-

ence with the water-cooled models, neither the gas company nor Davies cared to sell them aggressively. If someone came in and wanted one, he could have it. Now that they are better satisfied with the air-cooled jobs, however, and since the gas rates are lower, they are considering ways and means of getting into the fray.

HAROLD W. BOYNTON is general manager of the Honolulu Gas Co., and A. N. CAMPBELL is new business manager. Their plan makes gas from oil, and is said to be an exceptionally efficient conversion operation.

All Servel and Electrolux equipment sold on time payments in the Islands is financed by the Davies company, at 20% down and the balance in 12 monthly payments.

Air Conditioning Installations—1

Only one air-conditioning installation had been made in the Hawaiian Islands at the time we were there. That one had been made by Carrier in the offices of W. A. Ramsay, Ltd., of Honolulu. The Ramsay company is distributor for Carrier and General Electric products in the territory.

STANLEY PETERSON, the sales engineer in charge of air conditioning for Ramsay, says he has two theater jobs on the fire, and that by the next time we come through the Islands he'll have the situation well under control.

Air conditioning so far hasn't seriously interested any other merchandising concern in Honolulu, although they're all reading very carefully everything about this subject which appears in the editorial and advertising columns of the News.

Air conditioning as an alleviative for uncomfortable climatic conditions doesn't seem to be needed so much in the Hawaiian Islands as in other localities.

Nevertheless, there is a definite market in the territory for air conditioning as health protection. The Islands have a large quota of asthma and hay fever sufferers.

Undisputed Leaders

All competitors say that W. A. Ramsay, Ltd., leads the field in the sale of household electric refrigerators, so it must be true.

PHIL S. PELL is vice president and general manager of the Ramsay department which sells G-E appliances. The Ramsay company deals in specialties, machinery, and engineering supplies.

ALLEN W. SMITH is manager of appliance sales, and W. J. KERN commercial manager. O. LUDEWIG is promotion manager.

In addition to G-E appliances, this concern also sells a complete line of "heavy" General Electric equipment.

Last year the Ramsay organization sold 1,242 of the 3,474 electric refrigerators sold in the Islands. In addition, this group sold 250 ranges.

The Ramsay company operates three retail stores, out of which 27 salesmen work. These men work on commission only. They get 10% on each box, plus an additional 4% at the end of the year if they have made their quota, which runs from \$1,000 to \$2,400 in sales volume per man. One of the three stores in Honolulu is manned entirely by Japanese, and caters exclusively to the trade of that race.

On the island of Hawaii the Hilo Electric Light Co. (which also sells Westinghouse refrigerators) is the Ramsay-General Electric dealer.

The Maui Electric Co. (which has seven retail stores) is one of three Ramsay-General Electric dealers on the island of Maui.

Acting as sub-distributor on the island of Kauai, the Kau Electric Co. (which is a utility, like the two other companies mentioned immediately above) sells G-E appliances at retail. On this island the Ramsay company may also appoint other dealers, with the consent of the utility.

It is necessary to carry a supply of replacement Monitor Tops on each of these islands.

One thing the Ramsay company (Concluded on Page 6, Column 1)

Refrigeration and Air-Conditioning Activity in Honolulu



(1) Air conditioning so far hasn't assumed an important place in the daily life of Honolulu, Editor George Taubeneck observes. Here he is shown entering the offices of W. A. Ramsay, Ltd., Carrier-General Electric distributor—the only air-conditioning installation in the city. (2) The showroom of Theo. H. Davies Co., distributor of Electrolux household and Servel commercial refrigeration, McCray and Friedrich commercial cases. (3) Electric kitchen demonstration, Hawaiian Electric Co. (4) Here, as almost everywhere else, the independent service man has made a place for himself. "Service on All Makes of Refrigerators," the sign reads. (5) Phil S. Pell, Ramsay's vice president and general manager, inspects a new G-E Flatop

Webb Tells How Strawbridge & Clothier Built Up Re-Sale Dept. & Promoted G-E Sales

By Phil B. Redeker

CLEVELAND—How a re-sale department, employing modern and aggressive specialty selling methods, built sales of G-E appliances in a rapid manner for a Philadelphia department store, was told by Maurice Webb of Strawbridge & Clothier at the recent G-E merchandising clinic.

Strawbridge & Clothier has handled General Electric refrigerators continuously since 1928, began Mr. Webb. Up until just three years ago the store hired, supervised, and paid its own salesmen. The distributor did the warehousing, made the deliveries, and rendered service to customers needing it.

Three years ago a resale agreement was signed by the local G-E distributor, and by Strawbridge & Clothier, whereby a G-E department was operated, and still is, as a resale department in the store.

Sales Control Changed

"Actually the only thing about the previous set up that was changed," said Mr. Webb, "was the matter of sales control. Where before that had been entirely the store's problem, now it became the distributor's problem—as well as the store's problem."

"So successful have we been with the resale plan of operation that the store now handles five makes of electric refrigerators, one gas refrigerator, and even 'top icer' refrigerators—all on the resale basis."

"As an illustration of what success we have had with our G-E resale department, in the first twelve months of its operation, we sold over nine times as many G-E major appliances as had been sold the preceding 12 months."

Reasons for Business Gains

"Our increase in G-E business for 1934 was more than 25% of the business for 1933, and our 1935 business was 37½% greater than for 1934."

Mr. Webb lists some of the reasons for this increased business as follows:

1. About three years ago a G-E kitchen was built on the housewares floor. After being up some two years and after attracting the attention and comments of several thousand Strawbridge & Clothier customers, this kitchen was torn down and a new one put up. In the present kitchen the refrigerator, range, and even the dishwasher can be made to operate.

2. Refrigerators are placed at a spot location on the main floor—about 20 feet from the information desk. Three refrigerators are there every other week.

3. From time to time permission is obtained from the distributor to feature certain specially priced refrigerators—usually year-old models. Since the distributor will not allow the store to advertise any special that is not available for sale by all his other outlets, most of our sales are of current, regularly priced models. Last year our biggest seller was the K-5, of which were sold some 71, the next was X-6 of which were sold 63, and next was the K-4 of which were sold 40 or more.

"Paul Lewis of Detroit, in speaking here, has inferred that one of the two things needed by a department store in order to do a job in electric appliances was lower terms than those quoted by utilities, dealers and distributor branch stores," charged Mr. Webb.

No Price Advantage

"We have had no terms advantage over anyone else selling G-E appli-

Heads New Firm



William Cohen, president and treasurer of Stewart-Warner Distributors, Inc., Washington.

ances in Philadelphia last year. We use the prices and terms laid down by the distributor. So do his dealers. So does the utility.

"When the local G-E distributor last June swung over to FHA financing exclusively, we obtained an FHA set-up with a strong Philadelphia bank so we were in a position to meet the terms quoted by every one else."

"We did set up at that time, on G-E appliances, what we call 'S. & C. terms.' The finance charges approximate ½ of 1% a month—which averages approximately 1% a year more than the FHA rate. Yet actually we wrote almost all of our refrigeration and washer business on these higher terms last year and are still doing it."

"So none of our increased G-E business can be traced to our having lower or longer terms than anyone else."

Advertising Increased

The store has done more G-E appliance advertising during the past three years than ever before, said the speaker. In keeping with the policy of the store the advertising is somewhat conservative.

"In terms of space actually bought and paid for in newspapers—including the 20% additional for masthead space and for institutional copy—it cost \$1.75 to sell \$100 worth of General Electric refrigerators in our G-E department during 1935," explained Mr. Webb.

"In the last analysis of what we have done to increase our G-E business," continued Mr. Webb, "we are of the opinion that most of whatever degree of success we may have achieved in the past two or three years is primarily due to the salesmen we select, how they are trained, and how their activities are supervised." He outlined some of the S. & C. salesman-hiring and training plans as follows:

Hiring Salesmen

1. Salesmen are hired, when needed, by advertisements placed in local newspapers.
2. Much better men are obtained from a blind ad listing a lock box number in the newspaper office. This requires that a man write his education, age, past selling experience, etc.
3. They must already own automobiles.
4. A young married woman was hired to do demonstration work, about two years ago. Before she left, a year and a half later, she was the third best refrigeration sales person in the department.

Training Salesmen

1. As the local distributor runs a three-day training school almost every week, any new salesman is required to go through this school before he is scheduled for floor duty.
2. Additional training is done at morning sales meetings. One is held every Monday morning and another every Thursday morning, starting at 8:30 and ending at 9:00 o'clock when the store opens.
3. Sales meetings are frequently attended by G-E factory and distributor contact men.
4. Slide films are occasionally shown.
5. Every attempt is made to get the salesmen to speak freely at these meetings, having in mind that anyone may have discovered a sales plan or a sales argument that can help his brother salesmen.
6. With but little attempt at direction on the part of anyone else, the salesmen themselves are asked to decide as to what rules and regulations shall govern the paying of commissions to two men involved in the same sale.
7. Be sure to have frequent sales meetings, held regularly, if you expect to "go places" with your major appliance department.

Sales Manuals

1. Each salesman is required to have some sort of sales manual in which to keep large illustrations of the various merchandise he is expected to sell.

Floor Time

1. A schedule of floor time for the week is made up previous to the Monday morning sales meeting. It is posted in the kitchen for reference throughout the week.
2. All salesmen have equal floor time. The poorest has just as much floor time as the best. Maybe this doesn't seem just right—but it does seem to keep everybody happy.
3. About 40% of the salesman's work week is spent on the floor.
4. Frequently only one man will be scheduled for duty at 9:00 o'clock. Others come on duty at 11:30 and at

12:30. This permits morning calls as well as evening calls.

Daily Report Forms

Mr. Webb described the daily report forms which his salesmen used, pointing out that different cards are provided for morning "cold canvass" calls, and afternoon follow-up and "user calls."

The "cold canvass" form has columns in which the salesman can mark the various kinds of appliances which the prospect already has, and what appliance the prospect indicates that she will next purchase.

Then there is a column under the heading "What must you do to get the order?" and another one for the date of the next call.

In the afternoon report form, some of the questions asked are: "Talked to Mr. or Mrs.?" "In House?" "In-

spected Present Equipment?" "What Must You Do to Get Order?"

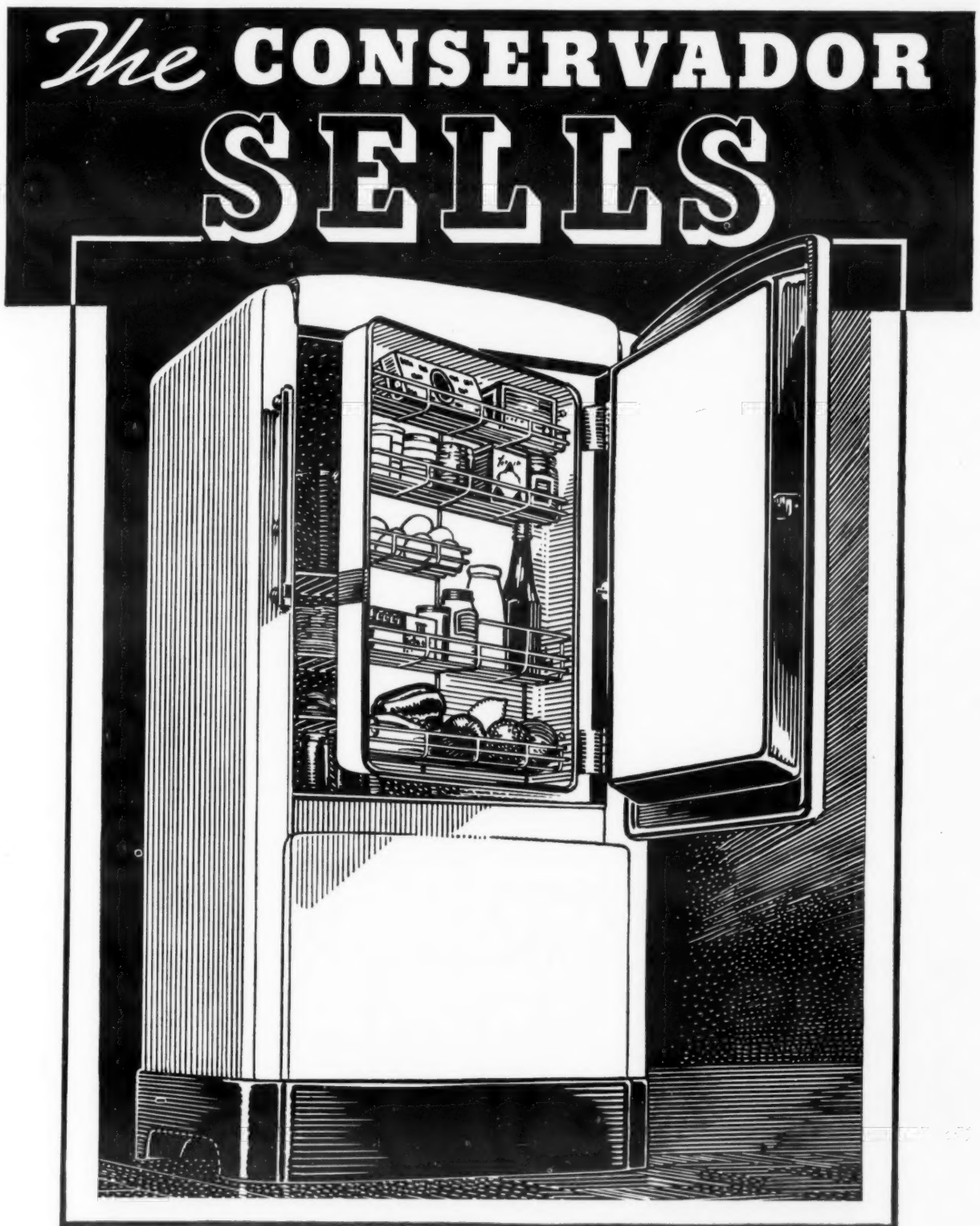
"Of particular value are evening calls immediately following contacts with the customer on the sales floor," declares Mr. Webb. "One might almost say that a call not made that night, but left until the next day or night, has only one-half the effectiveness. And if still another day is allowed to pass, only one-quarter the effectiveness."

Another Strawbridge & Clothier "canvassing trick" is the free appliance survey and adjustment practice, where salesmen get into homes to inspect appliances already installed, and get leads for the sale of other appliances. Recipe books, tray lifters, and screw drivers are some of the door openers used in this type of survey.

Summer Housewares Show Planned in Chicago

CHICAGO—A summer housewares and electrical appliance show sponsored by the Fourteenth Floor Mart Club will be held in conjunction with the showings of other major home furnishing markets to be staged in the Merchandise Mart July 6 to 18.

At a recent meeting of the club, President C. S. Keating appointed the following committee of 17 to act as the show committee: A. P. Hughes, temporary chairman, Walter Nye, E. A. Vandy, S. H. Felt, A. M. Collins, W. E. Kelly, H. I. Burgess, W. E. Anderson, A. J. Hammes, J. C. Amis, J. A. Bennett, J. M. Thomas, Lee Florsheim, L. H. Scurlock, Jr., E. C. Atkins, L. K. Clarke, and Mr. Keating.



F-M DEALERS chalk up new "highs"

Fairbanks-Morse refrigerator dealers are chalking up new sales highs. Why? Because the new Fairbanks-Morse refrigerator is the only refrigerator which provides an exclusive feature which can be quickly, easily, and convincingly demonstrated. This feature is the CONSERVADOR. You don't spend hours talking about economical operation. You merely show the Conservador—a shelf-lined inner door behind the main door which serves to keep the cold air from rushing out when the main door is opened. Prospects see the point in a split second. Anybody can understand how it works. But only in the Fairbanks-Morse can your prospect get the CONSERVADOR. Furthermore, the

Fairbanks-Morse offers everything offered by any other refrigerator—plus the exclusive CONSERVADOR.

Conservador Refrigerator Machine units are warranted for five years under an optional warranty purchase plan

TIME TO GET GOING—There IS a better profit opportunity in the refrigerator field. The Fairbanks-Morse franchise is the key to it. Get in on the new profit deal, find out about this fast-moving, nationally advertised refrigerator, with the exclusive feature. Write or wire now. Fairbanks, Morse & Co., Home Appliance Division, 2060 Northwestern Ave., Indianapolis, Ind.

FAIRBANKS-MORSE

Refrigerators

Other Fairbanks-Morse Products: Washing Machines, Ironers, Radios, Automatic Coal Burners

Around the World

With George F. Taubeneck

(Concluded from Page 4, Column 5)
has done very definitely is establish the five-year guarantee in the Hawaiian Islands as a commonly accepted feature of an electric refrigerator. Ramsay's competitors all declare that their prospects are acutely conscious of the existence of five-year guarantees, and that most of them appear to be sold on the idea.

Ramsay salesmen obtain prospects by ringing doorbells, through users, and by watching lists of building permits, marriage licenses, death notices (the bereaved are frequently left bequests), and arrivals on boats.

Effective Bureau

The Electric Refrigeration Bureau of Hawaii is a highly effective organization, according to Mr. Pell.

Not only has it kept competition clean, but it has done something about the trade-in situation. When one dealer appraises a box for a trade-in, he phones his appraisal price to the Bureau, where it is registered, and other members informed. The other dealers then stick by that evaluation.

Trade practices (laid down by By-Laws) of the Bureau, amended as of Jan. 16, 1936, are as follows:

Prices

The members shall file with the Clearing House of the Bureau a list of their uninstalled standard retail cash prices of household refrigerators. Any changes in these prices shall be reported to the Clearing House prior to public announcement. No deviation from these prices shall be made by means of discounts, discounts on other merchandise, secret rebates, allowances, bonuses, concessions, benefits, unusual credits, etc., or by any other plan, device, or other scheme which may directly or indirectly permit the buyer to obtain merchandise at a lower net cost, except to such recognized and established accounts as are entitled to discounts.

Members shall file with the Clearing House a discount classification which shall show all classes of businesses and all types of customers, exclusive of resale dealer accounts to whom they give discounts, and the discounts

they allow. This list shall include such organizations and agencies as Government Branches, Architects, and Educational Institutions, and any member may include any such organization, person, or firm, which he believes is entitled to discounts from regularly established prices. No member shall increase his classification to include other firms, corporations, or individuals, or increase his discounts without first having notified the Bureau of this change at a regular or special meeting, and without first having supplied the additional information to the Clearing House. It shall be the duty of the Clearing House to compile all such lists received into a master-discount classification for distribution to all members, and this master list shall show each classification included by all members, and maximum discounts allowed. It is to be understood that no member shall be obligated to quote such discounts as are shown, each member having the privilege of using any discount he so desires, providing he does not quote discounts in excess of the discount filed by him with the Clearing House.

Revised price lists to cover gross sales tax. Meeting of July 10, 1935:

A motion was made by P. S. Pell, seconded by C. E. Nolan, to have all members of the Bureau revise their present price lists by adding a minimum of not less than 1 1/4% to cover the gross sales tax. The following scale was suggested as being practicable:

Sales under \$100.00.....\$1.00
Sales under 100.00 to \$200.00.... 2.00
Sales under 200.00 to 300.00.... 3.00
and so on.

Trade-In Allowances, Prizes & Gifts

A. Ice Box Trade-Ins

Meeting of Sept. 18, 1935:

The members present discussed the advisability of discontinuing trade-ins on consignments of used ice boxes. On motion of Mr. P. S. Pell, seconded by A. Kong, and carried unanimously, it was agreed that commencing Oct. 1 no allowances will be made on used ice boxes and that no used ice boxes will be taken in on consignment. Members, however, will be allowed to haul used ice boxes away to auction

rooms or elsewhere for their customers.

B. Used Mechanical Refrigerator Trade-Ins.

Meeting of Sept. 25, 1935:

Any member or employee of a member who is informed by the prospect that the latter has an old electric refrigerator to trade in must first of all call the Bureau and find out if the refrigerator has been previously appraised. If so, he will be informed of the amount of the appraisal already set; if no appraisal has been made, he will appraise the refrigerator and immediately advise the Bureau, stating name and address of the customer, make, model, and serial number of the trade-in. The appraisal figure so established will remain in effect indefinitely, provided that if any other member feels that the appraisal has been disproportionate to the merchandise, he may call the Bureau, who in turn will call the appraising member, advising him of the complaint. Such appraising member is then at liberty, if he so desires, to revise this appraisal figure.

Amended at Meeting of Oct. 16, 1935:

The members present discussed the functioning of the new trade-in policy and found it to be working satisfactorily up to the present time. However, Mr. P. S. Pell moved and Mr. V. E. Jones seconded a motion that an appraisal figure once established with the Acting Secretary, as previously agreed upon during the last meeting (Sept. 25), remain in effect for one day, up until 9 o'clock the following morning.

C. Gifts

Members shall not make any gift or prize as an inducement to purchase, unless such a policy is sponsored by the manufacturer, or by the Bureau as a part of a specially advertised sales campaign.

Discount for Retail Cash Selling Price As Follows:

Meeting Jan. 19, 1934:

Educational Institutions, maxi... 20%
Federal Government bids, maxi... 25%
Territorial & County Govt., maxi... 10%

Amended at Meeting of July 10, 1935—
Apartment House Owners, Quantity Discounts:

Two to five refrigerators, 5%.
Six units and over, 1% additional for each unit sold up to a maximum of 25%.

Damaged Merchandise

Meeting of July 10, 1935:

The question of proper handling of damaged merchandise was discussed by the members present, and it was the consensus of opinion that the practice of selling damaged merchandise at a discount be discouraged and that hereafter wherever possible the merchandise be reconditioned and sold at the regular retail price.

Free Wiring

Meeting of Sept. 6, 1933:

Free wiring is considered unfair practice and wiring shall not be less than cost, providing \$7.50 can be considered as a fair charge where inspection of premises has not been made.

Amended at Meeting of July 10, 1935:

It was moved by C. E. Nolan, and seconded by V. G. Jones, that all members submit to the Bureau new lists of their uninstalled prices, and add their cost for wiring only when necessary.

Free Trials

Meeting of Jan. 18, 1934:

It shall be considered unfair trade

Four of the Editor's Honolulu Hosts



Top row, left to right: J. W. Rubenson, sales engineer in charge of refrigeration sales, Theo. H. Davies Co., and George T. Kluegel, assistant manager of the company's hardware department.

Lower row: Phil H. Pell, vice president-general manager of W. A. Ramsay, Ltd., and Riley Allen, editor of the Honolulu Star-Bulletin.

practice to deliver any mechanical refrigerator to a prospective purchaser on approval, or free trial, or display merchandise without its cash retail price plainly marked thereon.

Reporting of Repossessions

It shall be the duty of every member immediately to report to the Clearing House all repossessions made and the reasons for repossession. The Clearing House will notify all members immediately, and will keep a permanent record of all repossessions so reported.

Trade Discounts to Employees of Other Businesses

Members shall not grant or offer any discount or reduction in the regular retail price to employees of other business houses, which houses are entitled to a regular commercial discount, unless accompanied by a regular written order.

Terms and Conditions of Contract Payments

Terms and conditions of instalment contracts will be determined and established by the Bureau, having due regard to accepted or standard practices in the trade, and to the need for control over this operation.

Members shall adhere to these terms so established and will not quote, charge, or allow any terms in excess thereof. Terms, both as to down payments and length of time, may be changed from time to time by the members by unanimous consent.

Finance Charges

Meeting of May 3, 1933:

12 months 7%
18 months 10 1/2%
24 months 14%

(Above minimum rate added to unpaid balance.)

Minimum Down Payments

Cash selling price:
Up to \$200.....\$10.00
\$201 to \$250..... 15.00
\$251 to \$300..... 20.00
Over \$300, minimum 10%
Meeting of Jan. 18, 1935:

It is considered unfair to accept a time contract from the purchaser of a mechanical refrigerator on terms in excess of 24 months.

Miscellaneous

Trade-Ins

Meeting of Jan. 19, 1934:

Clause D, Section of Retail Code Schedule "D" altered to read as follows:

"Accept any ice box in trade on an electric refrigerator for an amount not in excess of 5% of the retail uninstalled cash price of the new refrigerator. This amount is not to be considered as a part of the stipulated cash down payment."

Lift Tops

Meeting of Aug. 23, 1934:

Method of handling new lift-top type refrigerator:

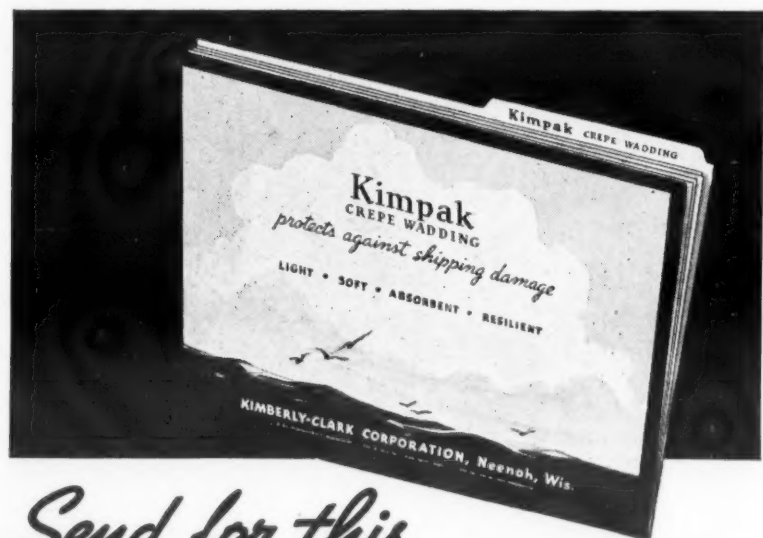
1. No trade-in taken on lift-top models.

2. Apartment house and industrial discount on lift-top models, 5%, 7 1/2%, and 10% on the same quantity basis as on standard models.

Sales Plans or Campaigns

Meeting of Jan. 18, 1935:

Trade practices do not restrict any dealer from following any special sales plan or campaign when the manufacturer of the product being sold by the dealer is promoting or sponsoring such campaign nationally. In such case, it shall also be the privilege for any other refrigerator dealer or establishment to adopt similar plans that will permit said dealer or establishment to meet his competitor on fair terms.



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Department Store Executives Tell How They Promote Sales of Washers, Radios, And Small Appliances

By Phil B. Redeker

At the recent "Merchandise Clinic" which General Electric held for appliance department managers of department stores, one of the sessions was devoted to washers, radios, and small appliances.

A. L. Pierce, in charge of department store sales for General Electric's merchandise (Bridgeport) division, was chairman of this session, and showed (by means of the table shown at right) the market for such appliances and the percentage of the total volume of such business that department stores were obtaining.

Mr. Pierce introduced department store men who have had particular success in merchandising such appliances, and they told their story to the clinic.

Holley Claims Stores Carry Too Many Kinds of Washers

In the opinion of J. K. Holley of J. Bacon & Son, Louisville, Ky., there are two principal reasons why department stores aren't more successful in selling washers:

1. Too many lines are carried, with the result that there is no concentration on any one line.

2. Little or no attention is given to the training of salesmen.

"Bacon's went exclusive with one line of appliances last summer with the result that washer sales increased 31%, and refrigerator sales better than 200%," declared Mr. Holley.

"It's my belief that these results are due to the effect that an exclusive line has on a salesman. He becomes sold on the product, and tells a better story."

"Another advantage in going exclusive is that you can demand more sales help from the distributor."

In selecting and training salesmen, Mr. Holley declared that selection of salesmen is an all-important item, and one to which the department manager should give his best attention. Salesmen should be qualified to do outside canvassing, he said.

Salesman Sells Only One Appliance

"We have found it best to have separate salesmen for each appliance—that is, a washer salesman doesn't sell refrigerators, and vice versa."

"How do we know how many salesmen we ought to have? We take our expected total sales volume on an appliance and divide it by the average volume of sales that is done by salesmen, and that gives us our needed manpower."

With respect to service, Mr. Holley said that it is "farmed out" to an independent electrical service man at the rate of 75 cents per machine, the store also giving this man all the "charge" service work which the store gets.

Cashman Explains Growth of 'Gimbel's Radio Hall of Fame'

How the Gimbel Philadelphia store has become established as one of the largest outlets for radio equipment in Philadelphia, was told in the paper prepared by Clarence Cashman.

"The unit volume of radio sales from 1925 to 1935 is estimated to average 10,000 sets per year," the paper said. "The store regards radio as sufficiently important that it maintains two separate radio departments—in the main department and a subway store department."

Establish 'Hall of Fame'

"We established a new radio department in our Philadelphia store last spring and identified this section on the store directories and in every radio newspaper advertisement as 'Gimbel's Radio Hall of Fame.' The opening of this department was advertised in four column ads in all the Philadelphia papers. Three prominent stars from broadcasting's 'hall of fame' made personal appearances. Miniature self-recorded records were made for the youngsters if accompanied by parents."

"More than 3,000 log books were distributed on the opening day. Each log book was imprinted with a 'Gimbel Radio Hall of Fame' block of selling copy to indicate the best and most dependable brands of radio were all featured by Gimbel's. We featured a contest to find the oldest radio set in service in Philadelphia and awarded the prize of a new set to an elderly lady who had continued to use a crystal set of the vintage of 1921."

"Later we undertook a consistent campaign of 12 ads of uniform size approximating 300 lines each to sell the public on the wisdom and pleasure of owning more than one set. This campaign was very successful from the standpoint of sales. I think we agree that we are trying to sell sets to a saturated market and I think much can be done to make additional

sales on the appeal that every home should have more than one radio.

Meet Prices of Other Stores

"Our best efforts are devoted to trying to sell quality sets at a sensible price but where reputable stores give us competition on price appeal merchandise we meet it. We undertake to restrict our number of staple lines by brands to a reasonable minimum."

"At one time we sold more than 12 different brands; more recently we have cut down to five in the belief that our turnover will be bettered and that we will have less return problems of selling sets a second time and especially because many makers have given us quota incentives to establish a department on a basis of a complete line of model appeal restricted to a reasonable number of leading brands."

"We have never been able to maintain a good outside selling crew on radio. The mark-up on sets allows only so much for selling cost, and we can't maintain a crew of outside men within the limits of allowable selling expense. Of course, we follow up any worthwhile units for which we have a prospect, but not in the strict sense of outside selling enterprise."

Support Special Events

"We undertake to support special events held by the store as a whole as our share of the burden, and we make every effort to provide a worthwhile radio item for all special events."

"Manufacturers are taking an increasing interest in the trade-in problems of the retailer and they are coming to the point where they recognize that the retail trade must buy a set in 75% of the transactions before a set can be sold. I commend the General Electric Co.'s recent trade-in plan of selling by which the trade-in allowances were recommended as uniform practice."

Special Sunroom Boosts Sale of Sunlamps

"Sunlamps can best be sold if they're put in the right kind of 'atmosphere' Robert Johns of the Higbee Co., Cleveland, told the clinic."

He explained that Higbee's had built a special sunroom in the appliance section of the store. This room was completely outfitted with sunroom furniture and lamps, and a registered nurse in uniform was put in attendance, to instruct and protect customers, and to lend prestige to the "health value" idea of sunlamps.

Prospects were invited to take treatments in the sunroom, and were often sold by this demonstration method of selling, declared Mr. Johns.

Four girls were taken out of the small appliance department and given special training to sell the sunlamps, said Mr. Johns, and this idea proved very successful.

"Sunlamps offer a profitable source of business because the margin is high, and because there is no need for a big floor stock—you can sell the models right off of the demonstration floor," Mr. Johns pointed out.

Grand Rapids Store Employs Demonstrator for Appliances

A capable woman demonstrator has helped to boost sales of small electrical appliances in the Herpoisheimer Co. department store at Grand Rapids, Mich., E. E. Bally told the clinic.

"Last November, we employed a demonstrator," he explained. "She especially demonstrated the mixer on the floor, handed out folders to interested people, served coffee from the glass coffee makers, made waffles and toast and was trained by the manufacturer's people to the point where she could answer any question put to her by any customer."

"Results during the six-weeks' period were so satisfactory that we have kept this girl on this assignment ever since and our business keeps growing rapidly. In fact, we gross more dollars per square foot of floor space from this small department than any other on our fourth floor."

"This past season we added a small stock of sunlamps. We had never sold sunlamps before, but we found that we have sold 82 this season by only investing in four lamps as a stock and running only two small ads."

"We have found that in building a profitable small electrical appliance business it is best to go along almost entirely on one high quality line, take advantage of their promotions and educational helps, have a highly trained sales girl in charge and limit our inventory to one line with a few items of the lower-priced merchandise from other lines for price appeal and to use in comparison with good quality merchandise."

Estimated Department Store Appliance Sales

Compared to Estimated Industry Sales for 1935 and 1936
Based on Retail Selling Price

| | 1935 | Total | 1936 | Department Store | Dept. Store |
|---------------------|---------------|---------------|---------------|------------------|-------------|
| | | | | 1935 | Percentage |
| | | | | 1936 | To Total |
| Radio | \$260,000,000 | \$270,000,000 | \$52,000,000 | \$54,000,000 | 20% |
| Home Laundry Equip. | 89,300,000 | 90,700,000 | 17,860,000 | 18,140,000 | 20% |
| Cleaners | 54,740,000 | 59,000,000 | 13,690,000 | 14,750,000 | 25% |
| Clocks | 8,940,000 | 10,600,000 | 2,240,000 | 2,650,000 | 25% |
| Sunlamps | 840,000 | 1,200,000 | 340,000 | 480,000 | 40% |
| Fans | 11,400,000 | 13,000,000 | 1,710,000 | 1,950,000 | 15% |
| Heating Devices | 52,000,000 | 56,000,000 | 15,600,000 | 16,800,000 | 30% |
| Total | \$477,220,000 | \$500,500,000 | \$103,440,000 | \$103,770,000 | 22% |

Hollister Cites Lack of Coordination in Manufacturers' and Store Advertising

Advertising expenditures by manufacturers are going to waste because there is no coordinated plan or effort by which the retailer can take advantage of them, declared Paul Hollister, executive vice president and publicity director of R. H. Macy & Co., New York City, at the G-E Clinic. Mr. Hollister blamed both manufacturer and retailer for failing to devise means of taking advantage of such expenditures.

"The chief gripe in the sales promotion, or advertising, of electrical appliances in department stores today is the waste in money and effort traceable to a lack of coordination of effort," claims Mr. Hollister.

"The manufacturer utters a costly spread in a national magazine which circulates to the worthwhile families of every large store community in America. Family for family, the cost of that advertisement is very small. So far it is thrifty, and efficient."

"Now, without tracing the effect of that spread upon the consumer, let's look inside the store."

"If a department store could buy a spread in color, in a paper which would circulate only to its best income families throughout the community, at a per-family rate comparable to the rate the manufacturer pays, he would consider himself a lucky space buyer."

"But he wouldn't stop with printing that spread. He would dress his department, he would hold sales meetings, and set up contests for a drive, he would print store posters and talk about the offer on his radio show and include a mention of it in his store handbills or his direct mail matter."

"Why? Because he would jolly well see to it that his major investment in his costly advertisement, should not be allowed to die a-sprouting. He doesn't like to waste his own money."

But the storekeeper, having spent no money of his own, feels no responsibility to make the manufacturer's dollar work. It's illogical, but it's true, and human. And it is wasteful.

"The result is that the manufacturer

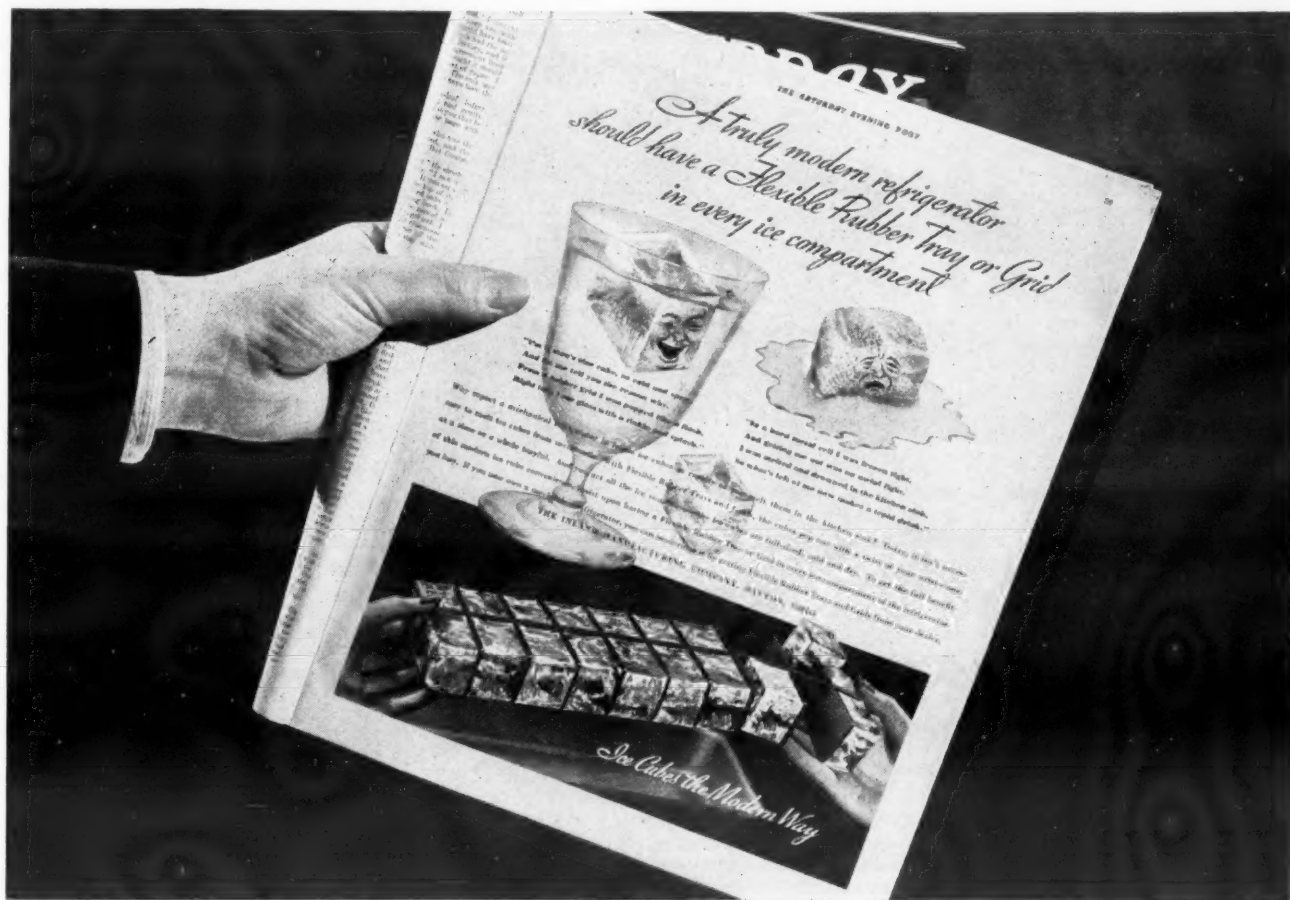
says: 'Well, to hell with 'em. We'll make our double spread so juicy, so emotional, that it will drive people to hunt all round Robin Hood's barn for the store that sells the product, then ask a lot of dumb clerks to search it out, then finally locate it, then pry out of an uninformed salesperson the facts about it, and then, almost in spite of the store, to buy.'

"I believe the manufacturer ought not to feel that the minute a retailer suggests a promotion allowance that chisels are being sharpened," said Mr. Hollister. "I believe that the reason for the suggestion is rooted in the fact that without knowing exactly how magazine advertising is remote from the store in its effect, he knows that it is relatively unconvincing, in so far as direct and prompt response is concerned. He is cool to any form of advertising which is laggardly and unconvincing."

In discussing the matter of advertising allowances, and what is a reasonable figure for such allowances, Mr. Hollister believes that the manufacturer, with the help of the department stores, can work out such a program very intelligently for each community.

"Let us see, the manufacturer will say, exactly what representation we can buy in community A, over a season's or a year's period. Let's see what that would cost each of us. Let's see, out of your retailing knowledge, precisely what that expenditure may prudently be expected to yield in actual and prompt sales. Then let's see what that final movement of goods to the consumer is worth to us as manufacturers."

"After we've plotted such a possibility for the community, let's see how much that leaves us to keep on creating long-range need, desire, emotion, and urge in handsome slow-motion magazine advertising. In short, let's plan our act first."



Full-Page Advertisements Feature Full-Sized Ice Cubes

Your refrigerator prospects know the advantages of Flexible Rubber Trays and Grids. A survey among recent refrigerator purchasers showed 99% expressing a definite preference for this ice cube convenience.

Now, full-page advertisements in leading magazines are telling your prospects that they can completely enjoy the advantages of this modern method of getting ice cubes by having a Flexible Rubber

Tray or Grid in every ice compartment of the refrigerators they buy. Then all of their ice cubes will pop out in a split second—one cube at a time or a whole trayful . . . all of their ice cubes will reach the glass full-sized, cold and dry.

You can give your salesman an important sales advantage by insisting that the refrigerator you sell comes factory-equipped with a Flexible Rubber Tray or Grid in every ice compartment.

THE INLAND MANUFACTURING COMPANY • DAYTON • OHIO

A TRULY MODERN REFRIGERATOR SHOULD HAVE A
FLEXIBLE RUBBER TRAY OR GRID
IN EVERY ICE COMPARTMENT

Air Conditioning

Baker Builds Line of Dual-Mounted Units To Give Flexibility

OMAHA, Neb.—To meet the variable requirements of spring, summer, and fall weather in air-conditioning work, Baker Ice Machine Co. has brought out a line of dual-mounted condensing units, with capacities automatically controlled for all-season efficiency and low operating cost.

Two 4-Cylinder Compressors

Largest model consists of two four-cylinder compressors, using either Freon or methyl chloride as the refrigerant, with motor and V-belt drive for each. Combined capacities range up to 60 hp., with compressors graduated in size, and fully automatic motor and temperature controls permitting three-stage capacity reduction on all models.

A shell-and-tube type condenser-receiver, with low resistance to water flow, permits use of a water cooling tower.

Mechanical Features of Unit

The mechanical features include Timken tapered roller bearings on both thrust and blind ends of crankshaft; automotive-type cylinders and crankshaft, cast in one piece to assure cylinder and crankshaft alignment; full-pressure lubrication, with built-in positive gear oil pump; double-trunk type, semi-steel pistons; precision-honed cylinder walls, and drop-forged steel connecting rods and crankshaft.

Units may be assembled in various capacities from Baker's regular line of models, ranging in size from 1/4 to 30 hp., two and four-cylinder types, for all standard duty and high suction pressure applications.

Buffalo Booklet Gives Capacities of Central Type Cabinets

BUFFALO—Buffalo Forge Co. has just issued a bulletin describing its Type "PC" central air-conditioning cabinets, and containing a series of temperature tables for both direct expansion and water cooling, for use in figuring coil and refrigerant requirements for various conditioning applications.

Line Sizes Recommended

Total heat and sensible heat extractions for various entering wet and dry bulb temperatures and various refrigerant temperatures are listed in the direct expansion tables. These capacities are given per 100 c.f.m. and apply to all sizes of cabinets when handling their base c.f.m. capacity, as given in an accompanying physical data table.

Recommended sizes of suction and liquid lines are also given, and cubical content of coils for determination of refrigerant charge is also given in the physical data table.

Heat Capacities Given

Total and sensible heat capacities for various entering air conditions and water temperatures are given in the water cooling tables. These capacities are also per 100 c.f.m., and apply to all sizes of cabinets when handling their base c.f.m. capacity, and supplied with the g.p.m. water listed in the water capacity table.

The direct expansion tables cover coil requirements from two to five rows; the water cooling tables from four to eight rows.

Conditioning Builds Restaurant Trade At Low Cost

BOSTON—Value of air conditioning as a low cost business-builder for eating places is shown by current consumption statistics recently compiled on the installation in the Patten Restaurant here.

The restaurant occupies a two-story building with a flat roof, having a surface exposure to the sun of approximately 8,700 sq. ft. Upstairs dining room has a seating capacity of 400, and 150 more can be served in the downstairs section.

During the summer months, the heavy sun exposure made the upstairs room anything but comfortable. To alleviate this condition an air-conditioning system was installed, figured to provide a temperature of 80° F. with 50% relative humidity, with an outside temperature maximum of 95° F.

Three duplex Frigidaire compressors, each driven by a 10-hp. motor were installed. Each compressor has a refrigerating capacity of 10 1/2 tons per 24 hours. Two units serve the upstairs cafe, and the other the ground floor dining room, the refrigerant being piped to cooling coils in the duct system through which the incoming air is circulated before entering the dining rooms.

One 2-hp. motor-driven fan serves the upper dining room, 6,300 sq. ft., and two 1-hp. fans serve the street floor cafe, the fans being used in winter to force warm air into the rooms after it leaves steam coils mounted in the chambers containing the cooling coils. The fans are rated at 15,000 c.f.m.

Watt-hour meter records for a year showed that the compressors used 19,946 kwh., or 36.2 kwh. per seat per year. It was estimated that about 2,000 kwh. additional were used in driving the fans during the conditioning season, bringing the total current consumption to approximately 40 kwh. per seat-year for the whole service.

Monthly consumption of energy for compressor operation ranged from 128 kwh., in March, to 6,728 kwh., in August. During the four "hot months" of June, July, August, and September, compressor energy consumption totals were 1,938, 5,006, 6,728, and 3,604 kwh., respectively.

During the whole year, the restaurant's use of electric current for all purposes, including electric kettles, miscellaneous power, lighting, and air conditioning, totaled 145,886 kwh. Air conditioning, according to this figure, has increased the restaurant's current use by about 15%.

Owners of the restaurant, however, assert that it rates a much higher percentage in its potency as a business-drawing factor.

Gettysburg Hotel Cools 2 Dining Rooms

GETTYSBURG, Pa.—York air-conditioning equipment is being installed in the dining room and coffee shop of the Hotel Gettysburg, the 110-room hotel here which yearly is host to 20,000 guests who come to view the historic battlefields of the Civil War.

Equipment for the installation includes a 10-hp. York Freon condensing unit and a York C-1000 air conditioner. The conditioning unit is being placed in the kitchen, and air is to be distributed to the dining room and grille through ducts which are concealed behind walls.

Between 40,000 and 50,000 persons are served annually in the two rooms which are being conditioned, states Henry Scharf, hotel manager, and president of the Pennsylvania Hotel Men's Association, who ordered the equipment from Morley Johnson, air-conditioning salesman of the York Ice Machinery Corp.

The corner on which the hotel stands has been the site of an inn or tavern for 150 years, the first of which was operated by John Gettys, who founded the town in 1780. The present hotel, built to replace the McClellan house of Civil War days, was modernized and enlarged in 1924.

Brown Changes Mounting Of Thermometer Bulb

PHILADELPHIA—By mounting the sensitive element or bulb of its new portable thermometer on the outside of the case, Brown Instrument Co. claims to have attained a quicker, more accurate temperature reading of natural air currents unaffected by instrument case temperatures.

Metal handles and metal legs, an aluminum case which is lightweight and corrosion resistant, moisture-proof gasketed door, and a tamper-proof door-in-handle lock are the other features claimed by the company for its new model of portable thermometer. A temperature record on the device is produced on an 8-inch, 24-hour chart.

New Jersey Utility Plans To Condition 4 Offices During Year

NEWARK—Equipment for all-year-round air conditioning will be installed this year in the Trenton, North Hudson, and Summit Commercial offices, as well as in the central addressing and billing departments, of Public Service Electric and Gas Co. in the Newark Terminal Bldg.

Maintenance of a constant relative humidity in the addressing and billing departments is calculated to improve efficiency by overcoming the difficulty of handling paper in humid weather, as well as to provide more comfortable working conditions, officials of the utility company explain.

Specifications as to the type of air conditioning to be installed have not been completed yet, but the installation at the Summit office will be gas-fired. The offices will be cooled and dehumidified in summer, ventilated and humidified in the winter.

Five commercial offices of the company are already air conditioned. Installations were made in Orange, Elizabeth, Englewood, and Camden offices last year and in Newark in 1934.

Melchior to Distribute Penn Controls

DES MOINES—Penn Electric Switch Co. has appointed Melchior, Armstrong, Dessau Co., Inc. to distribute its line of heating controls in New York City, and in branch offices in Brooklyn, Philadelphia, Baltimore, Harrisburg, Boston, and Rochester.

Preferred Utilities Manufacturing Co., 33 W. 60th St., New York City, continues as distributor of Penn heating controls through all of its offices.

Penn export sales will be handled, as in the past, through the company's export office at 15 Lighthouse St., New York City, in charge of A. R. Rocke.

Ilg Adds Small Kitchen Ventilator to Line

CHICAGO—Supplementing its regular ventilator line for use in large kitchens, Ilg Electric Ventilating Co. has introduced an "Ilgette" kitchen ventilator suitable for small kitchens. The new ventilator comes in four models, built-in-the-wall, portable window, window built-in, and transom.

Kelvinator School To Open April 6

DETROIT—Fourth of a series of air-conditioning engineering schools given by the Kelvinator Corp. as part of its 1936 training program, will be held at the factory April 6 to 17, states H. M. McGaughey, manager of the air-conditioning applications department, who will be in charge of the school.

While three schools were originally scheduled in the air-conditioning program, this final additional course is being given to provide specialized training for engineers of several recently appointed distributors of air-conditioning equipment.

Subjects to be covered in the course include: the basic theory of air conditioning, calculation of load, design application, selection of equipment, estimation of costs, sub-contracting costs and control, and supervision of the installation and service of air-conditioning equipment.

Assisting Mr. McGaughey, the following men will present a part of the course: J. K. Knighton, sales manager of the air-conditioning department, C. L. Toonder and C. H. Pierce of the air-conditioning applications department, and H. H. McGehee of the air-conditioning service department.

Marshall Is Midwestern Manager for Penn

DES MOINES—R. Douglas Marshall, sales engineer with Penn Electric Switch Co. for the last year, has been named midwestern representative, in charge of sales in the area served by the Des Moines office.

Mr. Marshall will devote his entire time to buyers and users of Penn heating, refrigeration, air conditioning, pump and air-compressor controls, stated Nelson B. Delavan, vice president and director of sales of Penn Electric Switch Co., in announcing the appointment.

York Distributor Shows Portable Conditioners

OKLAHOMA CITY—Hales-Mullaly, Inc., distributor of York portable air conditioners, held a showing of the new models to approximately 100 dealers and salesmen who attended a meeting March 6 at the Alvin Hotel in Tulsa.

Learn the Advantages of ARCO COPPER for every Refrigeration use

THE many advantages of Arco Copper Pipe and Fittings make them ideal for every refrigeration use. Arco Copper Pipe is highly corrosion resisting. It lasts longer—costs less. Arco Full Flow Fittings, like the pipe they join, are pure wrought copper with all the advantages of the pipe. Their coefficients of heating and cooling, contraction and expansion are identical with the pipe. They are non-porous, safe with any refrigerant. They provide a smooth, full flow without friction or bulky connections to gather sediment.

Replacements are easy. The copper to copper sweat connection is quickly made between pipe and fitting. It holds under tremendous pressure and strain. And it is just as quickly disassembled when necessary. Cut operating costs by cutting pipe and fitting costs with Arco Wrought Copper. The line is complete from 1/4" to 4" inclusive. Write for the details.

Arco Pipe and Fittings Division

AMERICAN RADIATOR COMPANY

Division of AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

40 West 40th Street, New York, N. Y.

ARCO

Full Flow

WROUGHT COPPER FITTINGS AND WROUGHT COPPER PIPE

NON-POROUS
•
VIBRATION PROOF
•
LEAKPROOF
•
SAFE WITH ANY REFRIGERANT
•
FOR EVERY AIR CONDITIONING REQUIREMENT

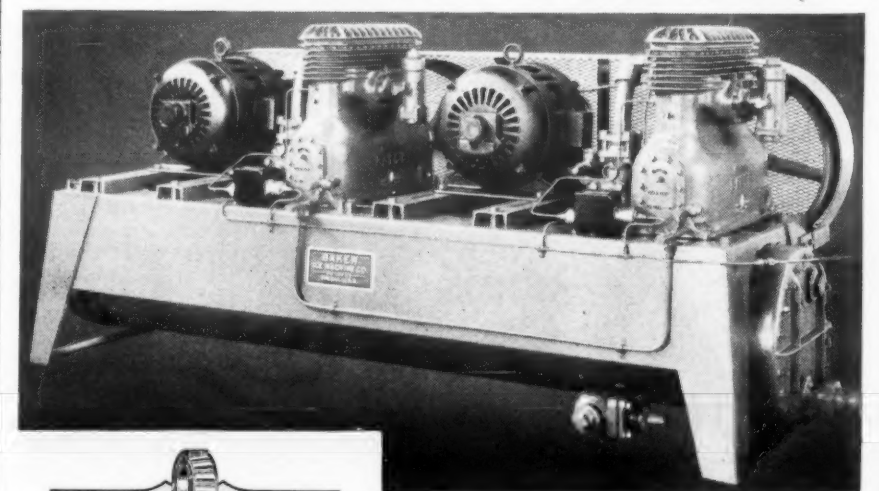
COPPER TO COPPER MAKES THE FOOLPROOF JOINT

The new 1-piece wrought tee with reduction on the run and on the branch.

The Year's Foremost Achievement

BAKER'S DUAL CONDENSING UNIT

WITH automatic CAPACITY CONTROL



TIMKEN BEARING EQUIPPED

77 MODELS—1/4 to 30 H.P.

BAKER

A modern condensing unit especially designed by Baker engineers to permit the flexibility of capacity control so necessary to balance heat load variations encountered during Spring, Summer, and Fall operation. The Baker Dual Condensing Unit assures higher efficiency and greater operating economy in all types of comfort cooling service. Full specifications on request.

This emblem is your assurance of reliable factory cooperation



BAKER ICE MACHINE CO., INC.

1507 Evans St., Omaha, Nebr.

Profitable territories available for dealers and distributors—write us for details.

Peerless to Manufacture All Coils for Kelvinator Air Conditioning and Commercial Applications

(Concluded from Page 1, Column 2)

Peerless, company officials said that recent additions to the company's commercial lines, including automatic heating equipment, beverage coolers, and a complete line of air-conditioning equipment, complicated manufacturing problems to such a degree that it was decided to pull out of the company's manufacturing departments anything which might be satisfactorily purchased outside.

Kelvinator Needed Space

The large number of commercial coils in Kelvinator's line tied up a large amount of manufacturing and warehouse floor space for cooling unit production, and so it was decided to relieve the problem by having those units made by an outside manufacturer. As a result of this decision, the arrangement with Peerless was made.

Several advantages will result from the new manufacturing arrangements, Kelvinator officials believe. Combined Kelvinator-Peerless production volume will make possible lower prices on cooling units; and, due to the method of manufacture it will be possible to make and ship units as ordered within 24 hours after the order is received.

Large Stocks Unnecessary

This, in turn, will make it unnecessary for distributors or dealers to stock large quantities or odd sizes of cooling units, obviate the necessity of distributors' carrying slow-moving models, and eliminate obsolescence due to changes in application trends and models.

The new "compression-locked" cooling units, so called because the fins

tured for Kelvinator by Muncie Gear Works, Inc., Muncie, Ind.

Five Sizes of Burners

The five sizes of Kelvinator burners run from 35 lbs. to 150 lbs. of coal per hour at the maximum rate of feed, with each size having a range of five different coal feeds. The smallest unit has a hopper capacity of 350 lbs., and the others a capacity of 500 lbs.

Distinctive in design, the burners are finished in gray enamel with blue stripe, and chrome or nickel-plated hardware. The hopper is constructed of 14 gauge steel with cast-iron base, louvred cover and right side panel. The front access, panel, and case access plate are equipped with winged screws for easy accessibility.

Transmission is of the special agitated type, equipped with five speeds and neutral to permit feeding the right amount of fuel for the weather prevailing. Self-lubricating gears, operating in a continuous oil bath, assure proper lubrication during the heating season.

Coal Liberates Gases

Coal is brought in under the fuel bed and pre-heated, liberating the volatile gases contained in the fuel, which are distilled off and pass up through the fire bed, igniting and eliminating smoke. Air is delivered to the fuel bed by means of a specially designed tuyere block. A totally enclosed capacitor-type motor is used.

Clean-out pipe is designed to catch the small amount of fly-ash which may occur and store it where it may be easily removed, without blocking the furnace or boiler passages. Low-voltage controls provide completely automatic operation, by means of a thermostat, limit switch, and time relay, which starts the burner at regular intervals to maintain the fuel bed and not permit the fire to go out.

26 Distributors Named For Kelvinator's Line Of Air Conditioners

DETROIT—During the first two months of the year, Kelvinator Corp. appointed 26 new distributors to handle its complete line of air-conditioning equipment, reports J. K. Knighton, sales manager of Kelvinator's air-conditioning division.

New distributors are: William F. Batterham Co., B. F. Gilbert Co., Inc., and Sam S. Glauber, Inc., New York City; Wittenmeier Machinery Co., Chicago; Sigwalt Lumber Co., Des Plaines, Ill.; Collin & Spalding, Elgin, Ill.; Waukegan Refrigeration, Co. Waukegan, Ill.; John A. Portner, Wheaton, Ill.; Stucky Brothers, Inc., Fort Wayne, Ind.; Lambert-Grisham Hardware Co., Henderson and Owensboro, Ky.

Lexington Refrigeration Co., Lexington, Ky.; Ada Refrigeration Co., Ada, Okla.; Newt Brunson Co., Austin; Community Public Service Co., and the General Engineering Corp., Fort Worth; Brown Bros., Ltd., Harlingen, Tex.; Judson Bagwell, Longview, Tex.; Calhoun Dry Goods Co., Muskogee, Okla.; Hagood Electric Co., Paris, Tex.; Goodner-Van Deventer Co., Tulsa; Henry Renter and Sons, Kankakee, Ill.

Spoerl Hardware Co., Hamilton, Ohio; Yudkin Bros., Ansonia, Conn.; Appliance Engineers of Rodasy Products Co., Inc., Hartford, Conn.; and Interstate Electric Construction Corp., Springfield, Mass.

are locked into the tubing, providing direct contact and eliminating soldering or tinning of fins, are machine-made of continuous tubing with a special spiral lining, which whirls the refrigerant around the entire inside surface, keeping all of the interior in direct contact with the refrigerant.

Aluminum fins and tinned copper tubing is used, and the fins are corner-locked to provide strength and rigidity and prevent the fins from being bent or twisted out of shape.

They are manufactured in the standard fin type, for walk-in coolers, storage rooms, refrigerated trucks; display case type; bare tube type, for display case and sub-freezing applications; and vertical type, for reach-in service refrigerators in grocery, restaurant, and similar installations.

New Coal Stokers Announced

Newest addition to Kelvinator's commercial line is an automatic coal burner, supplementing the line of oil-burning equipment brought out by the company a few years ago, and designed to give distributors and dealers in the residential air-conditioning field a line of automatic heating products for use with year-round applications.

The coal burners are being offered at present in five sizes, to fit all demands of the domestic market as well as many demands in the medium size commercial and apartment building field. They are being manufac-

138 Air-Conditioning Installations Made in Washington, D.C. During 1935; 77 More Than in 1934

WASHINGTON, D. C.—Air conditioning had its best year here in 1935. The 138 installations reported in a survey by Potomac Electric Power Co. were not only 77 more than the 61 reported during 1934, but came within two of equaling the 140 made in all years before 1935.

These figures are exclusive of installations in federal government buildings, of which 21 were made last year to bring the total for all years to 58. There are now 278 installations of air-conditioning equipment in Washington's homes and business buildings, and a total of 336 in the city, including government buildings.

Most notable in Washington's air-conditioning story for 1935 were increases in two fields—residences and private offices. In the residential field, 36 installations were reported, compared with only nine during 1934, bringing the city's total of air-conditioned homes to 60. Installations in private offices totaled 23, compared with 10 in 1934, and a total of 17 in all years before 1935.

Restaurant air conditioning also showed a nice gain for the year, 17 installations in this field bringing the all-year total to 43; an allied field, hotel dining rooms and cocktail rooms, reported seven installations.

In the general business classifications, gains were reported in several instances and several other new fields were entered. Among the city's business houses installing air conditioning for the first time were banks, jewelry stores, leather goods stores, linen stores, and millinery shops. In the jewelry store field, applications were especially notable, six being made during the year.

Stores of other kinds also increased their use of conditioning equipment during the year. Six department stores were conditioned, either totally or partially. Applications were also made in four dress shops, five drug stores, three 5-and-10-cent stores, two

| Class of Installation | Added During 1934 | | Added During 1935 | | Total To Dec. 31, 1935 | |
|---|-------------------|----------------|-------------------|---------------|------------------------|---------------|
| | No. | Hp. | No. | Hp. | No. | Hp. |
| Bakeries | ... | ... | ... | ... | 4 | 46½ |
| Banks | ... | ... | 1 | 25½ | 1 | 25½ |
| Beauty Shops | 1 | 11½ | 1 | 11 | 3 | 24 |
| Bowling Alleys | 1 | 3 | 1 | 15 | 2 | 18 |
| Candy Mfg. | ... | ... | ... | ... | 1 | 3 |
| Churches | ... | ... | 1 | 61 | 2 | 169 |
| Department Stores (Total and Partial) | 7 | 249½ | 6 | 1,097 | 14 | 1,506½ |
| Dress Shops | ... | 4½ | 4 | 49 | 5 | 57½ |
| Drug Stores | 1 | 5 | 5 | 147½ | 9 | 205½ |
| Exhibits and Displays | ... | ... | ... | ... | 6 | 21¼ |
| Five & Ten Cent Stores | 2 | 173 | 3 | 216 | 6 | 519 |
| Funeral Parlors | ... | ... | 1 | 12¼ | 2 | 27¼ |
| Fur Shops | 3 | 28½ | 2 | 2 | 5 | 30½ |
| Grocery Stores | 1 | 3 | ... | ... | 1 | 3 |
| Haberdasheries | 1 | 6 | 1 | 11½ | 2 | 17½ |
| Hospitals | 1 | 28 | 1 | 43½ | 3 | 161½ |
| Hotel Dining Rooms and Cocktail Rooms | 6 | 204½ | 7 | 122¾ | 17 | 833¾ |
| Hotel Sleeping Rooms | 1 | 51 | 1 | 108 | 2 | 159 |
| Jewelry Stores | ... | ... | 6 | 50¼ | 6 | 50¼ |
| Leather Goods | ... | ... | 1 | 23½ | 1 | 23½ |
| Libraries | ... | ... | ... | ... | 1 | 28 |
| Linen Stores | ... | ... | 1 | 6 | 1 | 6 |
| Market Spaces | ... | ... | 1 | 1½ | 3 | 4½ |
| Meat Processing | ... | ... | ... | ... | 1 | 16½ |
| Millinery Shops | ... | ... | 1 | 8½ | 1 | 8½ |
| Office Buildings | 1 | 422½ | 2 | 634¾ | 5 | 1,717¾ |
| Opticians | ... | ... | ... | ... | 1 | 2 |
| Printing Establishments | 1 | 28 | ... | ... | 2 | 90 |
| Private Offices | 10 | 25¼ | 23 | 111½ | 40 | 154¾ |
| Radio Studios | ... | ... | 1 | 2¼ | 2 | 12¼ |
| Residences | 9 | 12 | 36 | 82¾ | 60 | 136¼ |
| Restaurants | 10 | 360 | 17 | 267¾ | 43 | 921 |
| Shoe Stores | 4 | 29 | 8 | 93½ | 14 | 136 |
| Theaters | ... | ... | 6 | 531 | 11 | 2,563 |
| Wine and Liquor Stores | 1 | 2 | ... | ... | 1 | 2 |
| Totals | 61 | 1,645¾ | 138 | 3,735¾ | 278 | 9,639¾ |
| Federal Government | 22 | 14,222½ | 21 | 4,898¾ | 58 | 19,551¼ |
| Totals | 83 | 15,868¾ | 159 | 8,634 | 336 | 29,191 |

fur shops, eight shoe stores, and six theaters.

Two office buildings were also conditioned during the year, the horsepower load totaling 634¾ hp. Other installations included a radio studio, a

beauty shop, a bowling alley, a church (61 hp.), a funeral parlor, a haberdashery, and a hospital (43½ hp.). Total power load of the 336 installations in use in the city at present is 29,191 hp.

"Say...I'D CALL THAT Plush Padded SILENCE"

That's the first thing the owner of a new Brunner Refrigeration Unit said. The only sound he could detect was a gentle purr! Truly, "plush padded" silence. ★ ★ A good many years of study, experience and mechanical skill have made possible, not only this quiet smoothness of operation, but the many companion qualities—Brunner dependability, for example, and freedom from repairs, power-saving efficiency.

Team up with Brunner. Share in the satisfaction which has lifted Brunner Condensing Units and Compressors to so prominent a position in the Industry... Remember: there's a Brunner unit for almost every refrigeration need... forty-one condensing units, eight compressor models; from 1/6 H.P. to 15 H.P.; air and water cooled; electric motor or gas engine driven. Complete details on request. Brunner Manufacturing Company, Utica, N. Y., U. S. A.

Brunner Condensing Unit W-300... a popular 3-ton unit, with a smooth-running 4 cylinder compressor... sturdy... economical.



BRUNNER CONDENSING UNITS and COMPRESSORS

Air Conditioning

Revision of New York Code Liberalizes Use Of Indirect Closed Surface Cooling Method

(Concluded from Page 1, Column 3)
building they can be either of the indirect closed surface vented method of refrigeration or the double indirect open spray vented method of refrigeration.

Sections of the code which have been changed are published below, with the new parts in italics: (Note—the entire code as presented at previous hearings was published in the Nov. 13, 1935 issue).

Article 1.

General Provisions

Sec. 1. Definitions:

(n) Non-flammable Refrigerant: A practically non-flammable refrigerant. For the purposes of classification as a practically non-flammable refrigerant it is required that the refrigerant shall not form flammable mixtures with air, that is, propagate flame at temperatures (initial) below 100° Fahrenheit, and at higher temperatures shall form, if any, only weakly flammable mixtures. A weakly flammable mixture is a mixture of refrigerant with air which, when confined in a test chamber of one cubic foot capacity provided with a pressure indicator and a means of recording temperature, shall not in the presence of a source of ignition, between the temperatures of 120° F. and 125° F. (initial) develop a pressure except of a low order, and not more than 10 lbs. per square foot.

Further, it is required that under the above test conditions the low limit of flammability shall not be less than 15% by volume, and the ignition temperature as determined by A. S. T. M. Method D-286-30 shall not be less than 800° Fahrenheit. (See Underwriters' Laboratories Method for the Classification of the Hazards of Liquids—March, 1929.)

(z-3) Refrigerating Machinery Room: A room in which is located a refrigerating system but not including evaporators when located in a cold storage room, refrigerator box, air-conditioned space, or other enclosed space. Closets solely contained within and opening only into a room shall be considered a part of such room.

Article 3.

Bonds and Fees

Sec. 216. Permits and Approvals:

(b) A permit will not be required for a refrigerating system containing twenty (20) pounds or less of refrigerant, when located in the residence portion of a dwelling occupied by not more than two families, or in the residence portions of either a tenement house or a business building.

(c) No refrigerating system shall be installed, serviced, repaired or dismantled by other than the person, partnership or corporation who has obtained a license from the Board of Examiners in accordance with the rules and regulations of the Board of

Buildings, except as provided in Section 217 (d) and (e). The license shall continue in force for one year unless revoked or suspended for cause by the Board of Buildings. The licensee shall pay an initial fee of \$25.00, and for renewal thereof \$5.00 for each calendar year.

(f) None of the provisions of Article 18, Chapter 10, Code of Ordinances of the City of New York, as amended, is retroactive on installations made prior to the enactment of this Article. Sec. 219. Permissible Locations

1. Public Buildings.

(1) Brine or water cooled by an irritant and/or flammable refrigerant may be obtained from a system external to a Public Building for air conditioning such building provided the indirect closed surface vented method of refrigeration is used for cooling brine or water in a space external to and completely cut off from such building.

2. Residence Buildings.

(f) No refrigerating system employing an irritant and/or flammable refrigerant shall be used for air conditioning in a Residence Building, except by the indirect closed surface vented method of refrigeration and/or the double indirect open spray vented method of refrigeration.

3. Business Buildings.

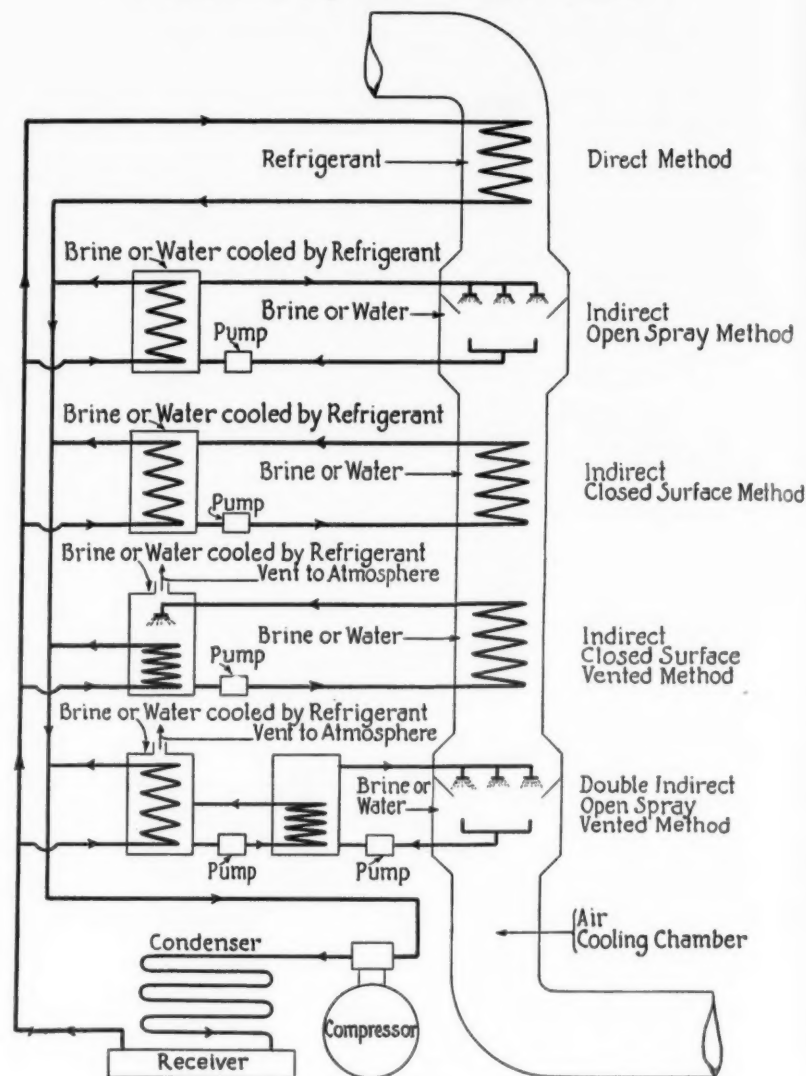
(n) Brine or water cooled by an irritant and/or flammable refrigerant may be obtained from a system external to a Business Building for air conditioning such building provided the indirect closed surface vented method of refrigeration and/or the double indirect open spray vented method of refrigeration is used.

Sec. 224. Piping, Tubing, Fittings, Supports and Air Ducts.

2. Filters and Air Ducts of Air Conditioning Systems other than Unit System Air Conditioners.

(b) In recirculating systems no air shall be recirculated from any space in which operations are carried on

Methods of Refrigeration for Air Conditioning as Described by New York Code



that produce or result in objectionable quantities of vapors, flyings, or dust.

(c) Air filters of combustible fibrous materials will not be permitted. Liquid adhesive coatings used on air filters shall be non-combustible or shall have a flashpoint higher than 300° F.

(f) Where filters are flushed with oil while in place, the system shall be arranged so that the filter cannot be flushed while the fan is in operation.

(g) In no case shall the clearance between metal ducts and stock be less than six inches.

(h) Ducts shall be made of non-combustible materials. No combustible linings inside or outside of ducts shall be used.

Sec. 225. Safety Devices:

(e) The size of pressure relief valves shall not be less than as follows:

1/4" for each shell type apparatus containing less than 100 lbs.

1/2" for each shell type apparatus containing less than 101 to 1000 lbs.

1" for each shell type apparatus containing less than 1001 to 3000 lbs.

1 1/4" for each shell type apparatus containing less than 3001 to 5000 lbs.

1 1/2" for each shell type apparatus containing less than 5001 to 7500 lbs.

2" for each shell type apparatus containing less than 7501 to above.

When a pressure relief valve larger than 1" is required, smaller valves of

equivalent or greater orifice area may be substituted.

Sec. 226. Operating Precautions:

(b) Every system which may be charged after installation shall have the charging connection located on its low pressure side. No container shall be left connected to a system except while charging or withdrawing refrigerant.

Well Water to Supplement Carrier Cooling System For Department Store

DES MOINES—Deep well water taken from two wells sunk on the premises will be used as part of the \$170,000 air-conditioning system to be installed in Younkers Brothers Department Store here by Carrier Engineering Corp. The installation, scheduled to be completed by May 15, is the largest Carrier order this year.

The installation will condition the entire store consisting of seven floors and basement, a total of 233,000 sq. ft. Cold water secured from the wells will be supplemented by centrifugal refrigerating machines of 650 tons capacity, which is equal to the cooling effect produced by melting 1,300,000 pounds of ice a day, Carrier officials say. Over 160,000 cu. ft. of air per minute will be circulated through the store, serving 14 sales departments.

Ask Your Nearest Penn Distributor

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Melchior, Armstrong, Dessau Co.

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Preferred Utilities Mfg. Corp.

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Borg-Warner Service Parts Co.
Chase Refrigeration Supply Co.
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Stevens-Root Co.
Utilities Service Co.

CINCINNATI, OHIO
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CLEVELAND, OHIO
Williams & Co., Inc.

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State Distributing Co.

KANSAS CITY, MISSOURI
A. Y. McDonald Mfg. Co.

LAKE FOREST, ILLINOIS
Thos. Bigford

LOS ANGELES, CALIFORNIA
Refrigeration Service, Inc.
Refrigeration Supplies Distributor

LOUISVILLE, KENTUCKY
Geo. Dehler, Jr. & Co.
Plumbers Supply Co.

MIAMI, FLORIDA
P. L. Tolerton

MINNEAPOLIS, MINNESOTA
A. Y. McDonald Mfg. Co.
Reinhard Bros.

NEWARK, NEW JERSEY
T. W. Binder Co.

NEW YORK CITY
Melchior, Armstrong, Dessau Co.
Paramount Electrical Supply Co.
Preferred Utilities Mfg. Corp.

NORFOLK, VIRGINIA
Odry Sutton Electric Co.

OMAHA, NEBRASKA
A. Y. McDonald Mfg. Co.

PHILADELPHIA, PENNSYLVANIA
Melchior, Armstrong, Dessau Co.
Merchant & Evans
Victor Sales Corp.

PITTSBURGH, PENNSYLVANIA
James T. Castle
Wm. M. Orr Co.
Williams & Co., Inc.

PORTLAND, OREGON
Stone Supply Co.

ROCHESTER, NEW YORK
Melchior, Armstrong, Dessau Co.

SAGINAW, MICHIGAN
J. Geo. Fischer

ST. PAUL, MINNESOTA
Gruen Bros.
Thermal Service

SAN FRANCISCO, CALIFORNIA
Scott-Buttner Refrigeration Co.

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TO CONTROL BUYERS:—If your supply house is not listed above, write us. They may have joined the Penn Group since this list was compiled.



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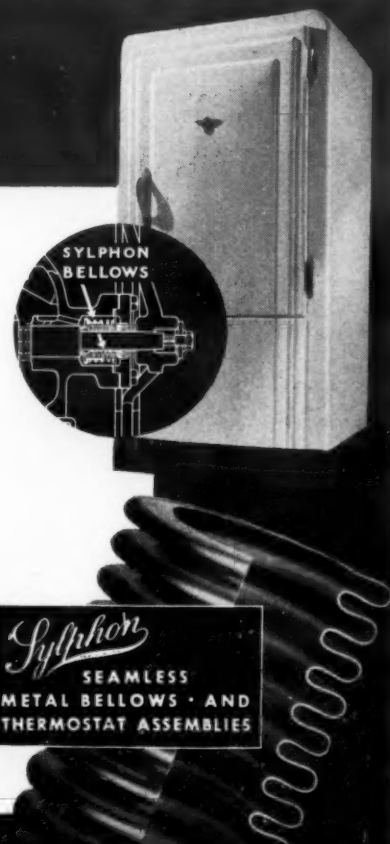
STEWART WARNER uses SYLPHON BELLOWS for Crankshaft Seals

For maximum durability—refrigerator manufacturers logically turned to metal—not only for principal structural members, but to replace troublesome wearing, leaking, or deteriorating parts, small in size but vital in importance to satisfactory service—free operation.

The Sylphon Bellows—a seamless, jointless "miracle in metal" has solved many such problems for refrigerator manufacturers by supplying the durability of metal while providing necessary flexibility for use where metal has never before been applicable.

The Sylphon Bellows is the product of over 35 years of experience—its satisfactory use is insured by a knowledge of Bellows properties and application which is unexcelled. This knowledge and experience is available to you for the asking. Ask for Bulletin FO-121.

FULTON SYLPHON Co.
KNOXVILLE, TENN., U.S.A.



Air Conditioning to Be Considered at Power Conference

CHICAGO—Refrigeration session of the Midwest Power Engineering Conference, to be held in the Palmer House here April 20-23, will be under the chairmanship of L. S. Morse, national president of the American Society of Refrigerating Engineers.

Speakers for this meeting, scheduled for Wednesday morning, April 21, will be Messrs. Zierber and Nicoll, of York Ice Machinery Corp., who will discuss "Air Conditioning Application," and Harry D. Edwards, consulting engineer of Carbide & Carbon Chemical Corp., New York City, whose subject is "Refrigerants."

Chase to Open Meetings

Frank D. Chase, president of the conference, will address the delegates at the opening meeting, Monday, April 20, after they have been welcomed by Chicago's mayor, Edward J. Kelly.

Twelve sessions are scheduled for the conference. Second day's program, under the chairmanship of Daniel W. Mead, president of A. S. C. E., will include a meeting of the American Institute of Electrical Engineers. Papers will be read by representatives of General Electric Co. and of Westinghouse Electric & Mfg. Co.

Other sessions and their chairmen are:

List of Sessions

"Power Economics," A. A. Potter, president of American Engineering Council; "Power Plant Buildings and Dams," Daniel W. Mead, president of A. S. C. E.; "Electrical Problems," American Institute of Electrical Engineers; "Diesel and Internal Combustion Engine Power," "Fuels" and "Classification of Coals by Use Value"; "Power Piping and Welding," E. P. Rich of Neiler, Rich & Co.; "Engineering Economics in the National Power Picture," F. F. Fowle, president of the Western Society of Engineers; "Power Plant Techniques," A. D. Bailey, chief engineer, Commonwealth Edison Co., Chicago; "Fuel Utilization," E. H. Tenney, St. Louis; "Power Transmission to Machinery," G. C. Miller, president of Dodge Mfg. Co., and "Fuel Economy and Controls," Paul Doty, St. Paul.

Refrigeration displays will be a feature at the Seventh Midwest Power Exposition, which is to be held in the International Amphitheatre building during the week of the conference. At the exposition, 100,000 sq. ft. of space will be devoted to the interests and products of the nation's leading machinery manufacturers, states G. E. Pfisterer, secretary of the conference.

Baltimore Store Fixture Firm to Sell Lipmans

BALTIMORE—Howard Store Fixture Co., 17 S. Howard St. here was recently appointed distributor of Lipman refrigeration and air-conditioning equipment.



McCord Refrigeration PRODUCTS

COMMERCIAL EVAPORATORS

DOMESTIC EVAPORATORS

CONDENSERS

METLFLEX ICE TRAYS

SPIRAL FINNED TUBING

AIR CONDITIONING SURFACE



McCord RADIATOR & MFG. CO. DETROIT

Books

"Handbook of Chemistry and Physics," Twentieth Edition. Editor in Chief: Charles D. Hodgman, Associate Professor of Physics, Case School of Applied Science, Cleveland. Publisher: Chemical Rubber Publishing Co., Cleveland. Pages: 1,950. Price: \$6. Review by T. T. Quinn.

CHEMISTRY and physics, always closely related sciences, have been brought into much more intimate relations by the recent developments of research. To an increasing extent, the student of either science should have a knowledge of the other.

That this is true, and that there is a large field for a single volume containing the constants and formulae of the two sciences, together with mathematical and conversion tables adequate for accurate computation, is evidenced by the fact that this Handbook, originally published in 1914, is now in its twentieth edition.

Although revised, general features and scheme of arrangement, which received extensive endorsement in previous editions, have been retained. A large proportion of the tables, with which the book abounds, have been compiled especially for the Handbook, from various authoritative collections of data, and from current journals.

The present edition contains more than 300 pages of new composition. Several tables have been completely revised or rewritten, and many pages of wholly new material have been added.

The volume is divided into five sections, approximately equal in size, and covering, in order: Mathematical Tables; Properties and Physical Constants; General Chemical Tables; Heat, Hygrometry, Sound, Electricity, and Light; Quantities and Units—Miscellaneous Tables.

Most notable change in the book is in the section containing the large table on "Physical Constants of Organic Compounds," which has been both enlarged in scope and changed in form. The most important feature of this table is the nomenclature worked out by Dr. Austin M. Patterson, professor of chemistry at Antioch College, and a member of the committee on organic nomenclature of the International Union of Chemistry, and chairman of the American Committee.

Dr. Patterson was given charge of the naming and arrangement of compounds, and has contributed an abridged form of the International Union rules for the naming of organic compounds, and a table of prefix names of organic radicals. Details of the policy followed in naming and arrangement have been outlined in the explanation preceding the body of the table.

Another innovation in the current edition is the presentation of the data in paragraph instead of tabular form. This affords a considerable saving of space, making possible a more complete listing of synonyms and cross references, the latter now being in their proper position, in alphabetical order, instead of in a separate list on the same or another page.

All data for a given compound are now given in a single compact paragraph, instead of being scattered across two pages, as in former editions.

Aim of the editors has been to present the material in such a way as to facilitate the finding of desired information. The order of items is invariable, and is the same as in the previous tabular form.

Name, synonyms, formula, and molecular weight are followed by a statement of the color and crystalline form, with the index of refraction and specific rotation, if available. This is followed by the three important constants—density, melting point, and boiling point—each indicated by appropriate abbreviation, in bold face type. Information regarding solubility closes the paragraph.

This style change, with its resultant saving in type space, has enabled the editors to add data on more than 1,100 compounds, without increasing the total number of pages in the Handbook.

A formula index of organic compounds has been compiled, referring by number to the compounds listed in the table. This should prove both interesting and valuable to those occupied with the study and identification of organic compounds.

Midwest Grunow Co. to Sell York Portable Conditioners

KANSAS CITY—Midwest Grunow Co., Grunow refrigerator distributor, will handle the York portable room cooler line, reports Norman Wilson, sales promotion manager for Midwest. The conditioner was recently displayed at the Better Homes Show here.

Friez Explains 'Effective Temperature' In Discussing Operation of 'Comfortrol'

BALTIMORE, Md.—To explain the operation of its new "Comfortrol" control for air conditioners, which incorporates both humidity and temperature sensitive mechanisms, and which automatically sets its own point of temperature control to meet the existing humidity, Julien P. Friez & Sons, Inc., have issued a bulletin discussing the matter of effective temperature.

Says the bulletin:

"It has come to be appreciated that dampness and dryness of the air have also a lot to do with the sensation of comfort, and these notes will now show the exact relation which exists between these two inseparable factors in human comfort and health.

"First we must understand that the ordinary temperature shown on a thermometer (dry-bulb) is not a true indication of body sensitive warmth or cold. Nor, of course, can we measure comfort in terms of moisture content of the air (% of relative humidity) alone. By what yardstick, therefore, may we measure body sensitive temperature or comfort?

"The leading technical body, the American Society of Heating and Ventilating Engineers, has spent years of research on the subject and has evolved a new index called effective temperature—a method that takes into consideration all three factors of temperature, humidity, and air movement and combines them into a figure expressed as degrees effective temperature.

"Let us for the moment assume that at some given number of degrees effective temperature—say 66°—you personally are entirely comfortable. The science of air conditioning can now show that great liberty is available in the proportion of temperature

and humidity that go to make a certain effective temperature or body sensitive condition of comfort.

"For example, that same 66° effective temperature can be built up by combining 74° F. temperature with 10% relative humidity, or by 68° F. temperature with 70% relative humidity. While in one case we have high temperature and low humidity, in the other we have low temperature and high humidity—yet we have the same sensation of body comfort.

"This leads to the discovery of a definite relation between humidity and temperature as far as comfort is concerned—the average being that 9% relative humidity is the same as 1° F. temperature.

"In conditioning the air of our houses, buildings, etc., we may therefore control humidity as well as temperature as is done on the better air conditioners, or we may attain true comfort by controlling the temperature in relation to the existing and uncontrolled humidity.

"But clearly we can not attain a constantly comfortable condition by holding a fixed temperature with the varying humidity sent by nature. (All this applies in summer as in winter.)

"In the more elaborate air-conditioning installations, both temperature and humidity are held constant and at the most desirable levels for comfort and health, the control instruments being thermostats and humidistats respectively.

"In the simple heating equipment (oil, gas, or coal burner) installed in most homes and buildings, we only have the means of controlling temperature and similarly in the ordinary cooling equipment, we only have means of controlling the temperature

and no really exact means of controlling humidity. Some heating equipment, it is true, does provide means of adding some uncontrolled humidity and some cooling equipment does dehumidify to some uncontrolled extent, but the fact remains that except in the most complete air conditioner, moisture content of the air is going to vary very considerably.

"Again remember that a constant temperature under such varying humidity can not produce constant comfort—we must hold not a constant temperature but a constant effective temperature; that is, a constant body sensitive condition and if humidity must be allowed to wander, temperature must be adjusted to meet and to provide humidity compensated temperature.

"At first sight this seems impossible for can anyone constantly watch the humidity condition and adjust his thermostat setting against a complicated chart or book of tables? In order to avoid actual discomfort some of us even try—by a process of more or less blind thermostat manipulation; but since humidity in the average home can vary from as high as 85% down to as low as 10% and since variance is a progress from high to low, we can not hope for real success even when we are willing to accept the task.

"Must we continue then to be comfortable at one time at 72° F. (in winter) and while our thermometer and thermostat remain steady at 72° F., be cold at one time and hot at another? Is the only solution to provide means of holding humidity constant also at all times?

"A solution has been hinted even in these notes to intentionally vary the temperature to balance the varying humidity—to raise the temperature as the humidity falls and lower the temperature as the humidity rises and thus result in unchanged effective temperature."

YOU DON'T TAKE CHANCES

6500 feet underground!



Safety becomes the most important factor when you're a mile and a quarter down. That's why "Freon" is the refrigerant in the air-cooling plant at The East Rand Proprietary Mines, Ltd., in South Africa

IN modern deep mining, every precaution must be taken to preserve human life and health. The development of air-conditioning will permit ore to be mined even deeper under the earth than at present. Natural hazards under such conditions require unremitting caution. Everything used in working the mine, in controlling the air, in handling ore, must meet the most rigid specifications.

The East Rand Proprietary Mines, Ltd., are now installing a modern air-cooling plant, manufactured by the York Ice Machinery Corporation, U.S.A. The plant will be installed at a vertical depth of 6500 feet and will have a capacity of 150,000 cubic feet of air per minute.

With an initial wet bulb temperature of 82° Fahrenheit, it is estimated that the temperature will be reduced to 73° Fahrenheit. This represents a cooling capacity underground of 6,000,000 B. T. U. per hour.

The same considerations of human health and safety which resulted in the selection of "Freon" for this unusual installation have dictated its use in thou-

sands of air-conditioning installations. "Freon" is used in hotels and restaurants, in office buildings, theatres and stores, in submarines, factories, warships and homes. Over 99% of all mechanically cooled railroad trains use "Freon."

"Freon" is non-poisonous, non-flammable, non-explosive. It is odorless when mixed with air up to 20% by volume. It does not harm foods, furs, flowers or clothes. It has been tested by the U.S. Bureau of Mines, and meets all the specifications set by the Underwriters' Laboratories of Chicago. Write "Freon" into your air-conditioning specifications for protection of health, life and property.



FREON

REG. U. S. PAT. OFF.

safe refrigerants

KINETIC CHEMICALS, INC., TENTH & MARKET STREETS, WILMINGTON, DELAWARE

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MARCH 25, 1936

A Question of Editorial Policy

DURING the past year we have received numerous inquiries about schools offering home study courses (by correspondence) or shop training in refrigeration and air conditioning. In some cases we have been asked to recommend a reliable school. Other letters request opinions on the merits of a particular school. Most of the letters are from non-subscribers who have been referred to the News by a local dealer.

There has been some question in our minds as to how far we should go in attempting to answer such inquiries. There has been still more of a question as to whether we owe any measure of duty to the industry to pass judgment upon the merits of such schools, the courses they offer, or their methods of doing business.

In the first place, it has been our general editorial policy ever since the News was established in 1926, to avoid any effort to set ourselves up as an authority on refrigeration science or its commercial application. Therefore, we have not attempted to make any decisions about the relative merits of manufactured products. Furthermore, we have not undertaken to tell the industry how to run its business.

It has been our publishing theory that we could render a worthwhile service and find plenty of work to keep ourselves busy, if we devoted our efforts to the job of reporting WHO had been doing WHAT, WHEN and WHERE, and (if possible) WHY.

We realize that reporting according to the rule of the five W's does not always satisfy our readers. Having reported the action of a company or individual, we are frequently importuned to go further and express an opinion as to whether such action is good or bad for the industry.

Those who seek editorial approval usually try to lighten our task by furnishing pages of "copy" with the desired "editorial opinion" all written out for us in complete detail. Long experience has led us to suspect that our own views are seldom desired.

Those who seek to invoke editorial wrath against industry evils and evil-doers, usually proceed differently. The standard argument is to the effect that only the editor, with his rare gift of eloquence, his unassailable position of authority and neutrality, can do the job of denouncing as it should be done. The editor is reminded of his high

responsibility, sometimes with the implication that if he fails to act promptly and in the manner specified, it will prove for all time that he is a craven and a coward who dares not lift his voice against advertising interests.

Thus we have come to the conclusion that there is no great demand for true editorial opinion. Supporting that belief is the fact that this paper has prospered, more or less, for nearly 10 years without any effort to defend the industry against its enemies or save it from its own cussedness.

Now and then we feel the urge to break away from the traditional policy. Perhaps we shall. Having repressed our desires for all these years, we may discard our inhibitions some day and shake the industry with our revelations.

We still do not care whether compressors are rotary or reciprocating. It makes no difference to us whether a machine is on the top or underneath. They can enamel 'em white or paint 'em pink. It is all the same to us if manufacturers want to guarantee for three months or 20 years.

We never could get wrought up when a smart distributor puts over a fast one on a smart manufacturer, or vice versa. They seem to be able to take care of themselves. At least, none of them have ever asked us to umpire a dispute.

Certainly, we have not shed any tears over the problems of the public utilities or the department stores. Even the plight of the dealer seldom excites our sympathies. Those who get stung are usually the ones who will not pay \$3.00 a year to get unbiased information. Some dealers get just as mad, if not madder, than the manufacturers if we print data unfavorable to the product they sell or fail to print favorable news which will support their judgment as buyers.

Now that we have exposed the inner workings of our cold and calloused minds, it may seem surprising to say that we have felt some concern over the innocent and inexperienced young man who is on the verge of signing up for a correspondence course which will cost him \$125.00 or thereabouts.

But obviously there is a vast difference between the inexperienced young man who is earnestly trying to fit himself for a job and the experienced businessman who typifies most of the readers of this paper. It really looks as though somebody ought to give him a helping hand or warn him against possible disappointments.

We haven't decided yet just what to do about it but in this issue we are publishing some correspondence about one refrigeration school. Included is a "publicity release" which was received from the school recently and which we would not ordinarily print without editing.

There is nothing in the correspondence to prove that the school is not giving good training. We have never seen the course of study. It may be worth the money, for all we know.

We do know something, however, about "publicity releases." We could probably qualify as an "expert" on that subject. And we have our opinion of this particular piece of publicity. Again we will refrain from expressing our own views and will follow our custom of asking the opinions of others.

Read the publicity release and see what you think about it. We are also asking the head of the school what he thinks about it, in the light of the letters received from some of the men listed as members of his "Advisory Board."

General discussion of the subject is invited.

How about It, Dr. Klekner?

Did you intend to give the impression that the refrigeration manufacturing executives listed as members of your "Advisory Board" are officials of your school? If you are the only official, why did you use the plural?

A Subscriber Inquires

Frank & Murray
44 Seventh St., So., St. Petersburg, Fla.
Feb. 1, 1936.

Gentlemen:
Please find enclosed order for one Master Service Manual. Ship as soon as possible.

Also give me information as to the reliability of the Refrigeration Engineering Institute of Youngstown, Ohio.

R. L. Phillips, Service Dept.

An Opinion Requested

I am thinking of signing an application blank with the Refrigeration Engineering Institute, Warner Building, Youngstown, Ohio, and would like to have your opinion as to the merits of this company. If you would be so kind as to tell me what you think of this company, I would appreciate it very much.—Hubert Zwick, 139 W. Chalmers Ave., Youngstown, Ohio.

A Publicity Release

"Dr. B. M. Klekner, president of the Refrigeration Engineering Institute, today announced the purchase and merging of the Utilities Instruction Laboratories of Philadelphia, Pa., and the Refrigeration Engineering Institute of this city.

"Both of the schools will have their home office in Youngstown.

"The Utilities Instruction Laboratories was organized some time ago in Philadelphia for the purpose of teaching electric refrigeration and air conditioning through the home study method. The course of the Utilities Instruction Laboratories consists of forty lessons through the home study method and two weeks of laboratory work under practical working conditions.

"The Utilities Instruction Laboratories was one of the leading refrigeration and air-conditioning schools in the eastern part of the United States.

"The servicing and the laboratory work of the students of the Utilities Instruction Laboratories will be handled in Youngstown by the Refrigeration Engineering Institute.

"The Refrigeration Engineering Institute was formed through the cooperation of the leading manufacturers of electric refrigerator and air-conditioning equipment.

"This is the first of a series of plans to make Refrigeration Engineering Institute the largest home study school in the United States.

"The officials of the new school are: Dr. B. M. Klekner, president, and the advisory board is composed of the following people: R. A. Plumb, vice president Truscon Steel Co.; Peter Heiser, executive, Gilfillan Bros., Inc.; K. E. Brooks, assistant manager, service department, Sparks-Withington Co.; E. G. Hyatt, Copeland Refrigeration Corp.; L. B. Crusius, Williams Oil-O-Matic Corp.; M. P. Stoney, manager, Merchant & Evans Co.; DeWitt H. Wyatt, M.E. Consulting Refrigeration Engineer; M. George Tigar, executive, Tigar Refrigeration Co., Refrigeration Maintenance Co., Ammonia Refrigeration Co.

"The Refrigeration Engineering Institute occupies the entire third floor of the Warner Building in this city.

"The School is a member of the National Home Study Council, National Better Business Bureau, Youngstown Better Business Bureau, and Youngstown Chamber of Commerce."

Letter Addressed to Some Of the Executives Listed

Dear Sir:
We have just received a news release from Dr. B. M. Klekner, announcing the merging of Utilities Instruction Laboratories of Philadelphia with the Refrigeration Engineering Institute of Youngstown. Utilities Instruction Laboratories is referred to as "one of the leading refrigeration and air-conditioning schools in the eastern part of the United States." The release also states that "the Refrigeration Engineering Institute was formed through the cooperation of the leading manufacturers of electric refrigerators and air-conditioning equipment."

Your name is listed as an official of the new school. In the same mail we have two inquiries, apparently from prospective students (one located in Youngstown) requesting information regarding the reliability of the Institute and our opinion of the merits of this company.

Owing to the fact that we have received complaints from refrigeration men regarding various schools offering home-study courses, and because we have no adequate information regarding the nature of the course of study offered by Refrigeration Engineering Institute, we do not feel justified in making recommendations under present conditions.

We will appreciate it very much if you will inform us in some detail regarding the activities of this organization, its facilities for rendering a worth while service, and the extent of your interest in it.

F. M. Cockrell, Publisher.

Mr. Plumb Has His Name Removed from Board

The Truscon Laboratories
Detroit, Mich.
Feb. 11, 1936.

Publisher:
It may impress you as a little unusual that I am in position to give you only very general information in reply to your letter of Feb. 8.

I have exchanged correspondence with Dr. Klekner, who was originally referred to me through contact he had made with our President, Mr. Julius Kahn, in Youngstown. I have also met on two or three occasions a Mr. Glancy, who, I understand, was largely responsible for developing the technical information in their training course. At least as far as my observations and contacts have extended my impressions have been fairly favorable.

Am asking Dr. Klekner to remove my name from the advisory board of the Refrigeration Engineering Institute as it is certainly somewhat unfair, in view of my having no active association nor being in position to really be intimately familiar with the quality of work they are performing.

I am sorry I am unable to be of more helpful assistance to you.

R. A. Plumb, General Director.

Has No Official Connection, Says Mr. Crusius

Williams Oil-O-Matic Heating Corp.
Bloomington, Ill.
Feb. 12, 1936.

Publisher:
This will acknowledge receipt of your letter of Feb. 10, with reference to the Refrigeration Engineering Institute of Youngstown, Ohio.

The writer has only served in an advisory capacity to the School, and has had no official connection with the Institute other than serving on the advisory board. This board being advisory to the school and not from the school.

Consequently, I am not in position to advise regarding the activities of the institute and the management of same, and am therefore unable to give you the information you desire.

L. B. Crusius, Service Department.

It's All News to Mr. Stoney Of Merchant & Evans

Merchant & Evans Co.
Philadelphia, Pa., U. S. A.
Feb. 13, 1936.

Publisher:
Thank you for your letter of Feb. 10 regarding the Refrigeration Engineering Institute. I have not heard of a proposed merger of this school with the Utilities Instruction Laboratories of this city. As a matter of fact, I have not had any communications from them for almost a year, so I can not give you any up-to-date information about them at this time. My only interest in this school was at the time it started up, they came in to see us here and showed us their literature and explained their service courses and we gave them our advice and our opinions on refrigeration service needs, and feeling that the industry at that time needed technical service men very badly, the writer promised to help them in an advisory capacity if called on from time to time, but I do not remember if that occasion ever arose.

In regard to the Utilities Instruction Laboratories here, we know them fairly well and have talked to men who have been through the course and they seemed well satisfied. We have also sold them refrigeration equipment at various times.

I am sorry I can not give you more definite information but if there is any other help you may need at any time please let me know.

M. P. Stoney, Manager, Refrigeration Dept.

Mr. Brooks Just Learned That His Name Was Used

The Sparks-Withington Co.
Jackson, Mich., U. S. A.
Feb. 16, 1936.

Publisher:
Please pardon the seeming delay in answering your letter of the 10th, I am on the road for my company, and your letter was forwarded to me. Please be assured that it is being answered at the first opportunity.

While I was assistant service manager, Dr. Klekner wrote us a letter at the time his concern was formed, asking if someone in our company would serve as advisor to him on subjects pertaining to our refrigerator, and it was agreed that I should do so.

In granting his request, if my memory serves me correctly, I was only to furnish him with any information he might want from time to time on the technical phase of our product, and at that time furnished him with our service manual and other data.

Inasmuch as I have never had the opportunity to visit his school, meet him personally, nor look over the course they offer, I regret I am not in a position to advise you one way or the other as to the merits of the course offered.

It is only recently that I learned that my name was being used as an official of his concern, and as I have not been connected with our service department for some time, I have written Dr. Klekner asking that my name be stricken from his records.

I believe that Dr. Klekner sent us references from several banks in Youngstown, attesting to his integrity, and at that time we saw no reason why we shouldn't cooperate with him to the extent we did.

May I suggest, that you write and ask for a course for inspection, and other information that you might want which would enable you to form an opinion of this school.

I regret I can assist you no more than this.

K. E. Brooks.

Letters

Air Conditioning

Dallas Air Conditioning Co., Inc.
Airdard Distributors
3500 Commerce St., Dallas, Texas
March 20, 1936.

Gentlemen:

Will you please address these folks and mail the attached letters. We do not have their address in our file having overlooked this at the Chicago show.

Thank you—very much.

Am sorry we missed George Taubeneck when he was in Dallas. We would have enjoyed telling him that our company sold 80% of all residence air conditioning sold in Dallas last year—the York line.

If any of you folks ever get down here drop in—be glad to see you.

VICTOR H. SMITH, Sales Mgr.

Spanish Translation

The Harry Alter Co.
1728 So. Michigan Ave., Chicago
March 23, 1936.

Gentlemen:

We would appreciate your advising us if your firm has any intentions of putting your MASTER SERVICE MANUAL into Spanish. We have an inquiry from one of our customers regarding same.

Answer: No plans have been made yet for a Spanish translation.

Please Rush Manual

811 Oakdale Ave.
Chicago, Ill.

Editor:

Enclosed find the money order for three dollars.

Please rush to me the new edition of MASTER SERVICE MANUAL. I have been a subscriber to ELECTRIC REFRIGERATION NEWS for a year, and feel that I would not be a day without this really remarkable publication, and being a new man to the industry naturally I especially appreciate your service and engineering sections.

ALEX N. IVANOW

Non-Subscribers Dept.

Charles L. Hills
Dependable Machinery & Equipment
106 Franklin St., Tampa, Fla.
446 12th Ave., N. E.
St. Petersburg, Fla.
Feb. 24, 1936.

Editor:

While I am not a subscriber to your periodical, I have constant access to it at this time at a local General Electric sales office.

However, I am preparing to get into the air conditioning and general refrigeration business here, including display cases, boxes, etc., for food stores. Already have some good agencies, including Baker on refrigeration, Warren Co. on display cases and boxes.

I am interested in securing new lines, and being kept posted on new ideas and installations, and if you will be kind enough to enter my name and St. Petersburg address in your mailing list for catalogs and literature of manufacturers of air-conditioning and refrigerating apparatus, display cases, and boxes.

C. L. HILLS.

George's Articles

Pray, Mont.

Editor:

Kindly send my News to Pray, Montana, instead of Livingston.

It is a real paper and I don't want to miss any of George's articles.

F. E. ASHLEY

Sears Wants Catalogs

Sears, Roebuck & Co.
The World's Largest Store
Chicago
Feb. 26, 1936.

Gentlemen:

I would like for you to place my name on your catalog mailing list. This is a worth while service, and I shall deeply appreciate it.

G. STUNK, Dept. 622.

"I just read your December issue, and think it the most wonderful trade paper I have ever read. Am enclosing my check for \$5.00, for one year subscription, to ELECTRIC REFRIGERATION NEWS, begin with Jan., 1936, and MASTER SERVICE MANUAL."—C. J. Yon, West Penn Power Co., State College, Pa.

Kindly enter the name of the writer (C. E. Walker) to your catalog mailing service. We enjoy your paper very much.—C. E. Walker, Mgr., Comm. Dept., c/o South Side Electric Co., 741 W. Indiana Ave., South Bend, Ind.

Systematic Telephone Canvass Helps Dept. Store Sell 5 Carloads of Refrigerators in '35

OGDEN, Utah—Getting prospects through the use of a systematic telephone canvass plan helped salesmen of Wright's department store here to sell five carloads of electric refrigerators during 1935, claims Reed Smith, head of the electrical appliance department.

"This method of canvassing enables our salesmen to follow up old customers, and to obtain a maximum number of new prospects at a minimum of time and expense," Smith said.

Users' lists and the telephone directory supply the source of telephone leads.

While salesmen canvass over the telephone when floor traffic is slack, the company also has a group of girls to do this work. Each call that is made is recorded on a card which is placed in a prospect card file.

Information that is put on the card includes the prospect's name and address, the time and date of the call, the time when the salesman may call at the prospect's house, and any indications of the type of personality which the person called gives through her telephone conversation. Follow up

is made on "no answers" or calls which receive the busy signal.

Qualifications which Smith claims necessary for successful telephone canvassers, are a soft, low-pitched voice, distinct enunciation, courtesy, tact, and a convincing method of talking.

"To simplify the telephone process, the canvassers are requested to learn a formula talk which contains approximately 100 words, with the name of the store and the refrigerator (Kelvinator) mentioned several times," Smith explained.

Telephone calls are followed up as soon as possible, the department head states, with personal calls. Sales are usually closed in the prospect's home, or in the show room, in which an electric refrigerator display room with a blue and gray color scheme was recently installed.

A duplicate card file system gives the salesman a complete file for his follow-up work, and enables the manager to determine the number of calls to interviews, the number of calls to sales, and other information relative to the effectiveness of the system.

Milwaukee Salesmen Cooperate in Canvass Of Territories for New Leads

MILWAUKEE—The Badger Refrigeration & Engineering Co. has developed a team-work system of cold canvassing, whereby all salesmen survey one territory at the same time, which has proved highly effective in keeping the entire sales crew supplied with live prospect leads, declares F. L. Simmons, household sales manager.

The firm has divided the city into 20 districts with a salesman to cover one or more of the districts. Periodically the entire sales crew canvasses in one district. Prospect leads secured are turned over to the man who works the territory regularly.

By rotating the procedure, each salesman receives extra help, and the company obtains thorough coverage of its entire territory.

"No compensation is given to members of the crew who get leads while working in another salesman's district," states Mr. Simmons.

The reciprocal nature of the arrangement has made it popular with the men, and has pepped up the sales efforts of the organization as a whole, he reports.

In dividing up the districts and

settling the boundaries for each, Mr. Simmons was guided by surveys made by local newspapers, and by a national magazine, which contained indications of the potential purchasing power of the residents in each district.

From the house-to-house canvasses by its men, the company has been able to formulate an accurate census of the market for refrigeration in Milwaukee. Records of salesmen's calls are kept in the company office. These tell whether or not the housewife has an electric refrigerator, and, if she has, the make, size, and age of the box are noted.

This filed information, Mr. Simmons states, is not only valuable as a source of future sales leads, but it is also used by the service men to check on service calls before leaving the office.

Mr. Simmons states that 25% of the people who purchase electric refrigerators from the Badger Refrigeration & Engineering Co. prefer to pay on the 15-cent-a-day meter plan, 10% use the FHA payment plan, and the balance of the customers pay cash, or buy on 12 to 24-month terms.

Ozanne Criticizes Promotion Methods and Selling of Appliances in Dept. Stores

CHICAGO—Sales are being lost in the housewares and appliance sections of many department stores because the merchandise is being "starved" by insufficient promotion, lack of informative material, and the disinterest of sales persons, J. Roy Ozanne, marketing consultant to the Merchandise Mart, told the buyers and manufacturers' representatives who attended the recent monthly luncheon of the 14th Floor Mart Club.

Backing up this assertion with facts, Mr. Ozanne told the luncheon guests that in a survey of 35 stores which he had just completed, he found that in many stores displays were kept carelessly, outmoded counter cards were being used, and, in some cases, the merchandise displayed was old or shop worn.

"In one refrigerator department not

one box was open so that the customer might examine the interior of the refrigerator," he stated.

"In another instance," Mr. Ozanne related, "because I had a brief case under my arm, the clerks assumed that I was a salesman, and didn't bother to find out if I was or not."

Responsibility for these conditions rests with the store buyers, Mr. Ozanne declared.

"The slipshod methods revealed in the tour indicate that too few buyers are aware of modern merchandising methods," he added.

More than 100 members, among whom were 35 buyers, attended the luncheon which was presided over by C. S. Keating, president. Plans for coming luncheon meetings were outlined.

Norge Distributor Outlines Plans to Dealers For Selling Refrigerators to Veterans

DENVER—Plans by which dealers in Colorado and in Northern New Mexico can sell electric refrigerators to veterans receiving bonus money were outlined in the 1936 merchandising program which the Auto Equipment Co., Norge distributor here introduced in two dealer conventions, held in Pueblo, Colo., and in Denver, and in letters mailed to the dealers after Congress passed the bonus bill.

To capture the bonus trade, the distributor suggested that dealers offer the following terms: small or no down

payments, installment payments to start when the bonus money is paid, discounts or cancellations of carrying and interest charges if cash is paid when the bonus is received.

"Terms of the discount arrangements, and the methods used to advertise and promote the plan, are entirely up to the dealers," stated I. H. Parks, manager of the electric refrigerator department of the Auto Equipment Co.

Illustrative of the manner in which Norge dealers operating under this distributorship have developed the idea, is the bureau which the Joslin Dry Goods Co., Denver, established to aid veterans in filling out papers.

Names of the veterans who came to the bureau were filed. Two days later the company sent a letter to each veteran explaining the easy-term merchandising plan by which he could purchase an electric refrigerator.

Geo. S. Conley Co. Moves

DENVER—The George S. Conley Electric Co., distributor of Gibson electric refrigerators here, has moved to new quarters at 635 15th St.

Four New Field Men Named by Frigidaire Kansas City Branch

KANSAS CITY — Appointment of four new field representatives to the Frigidaire Corp. offices here, was recently reported by P. K. Abry of that company.

N. A. Naugle, previously with the Kansas City Power & Light Co., has been placed in the sales educational department for the Kansas City area. Jack Gannon will also be in that department.

Ralph Lady, formerly supervisor for Karlan Furniture Co., Frigidaire dealer in Topeka, Kan., will be in the general sales contact division; and Glen Lineberry, also with a Frigidaire dealer at Brookfield, Mo., has been named as a commercial field contact man.

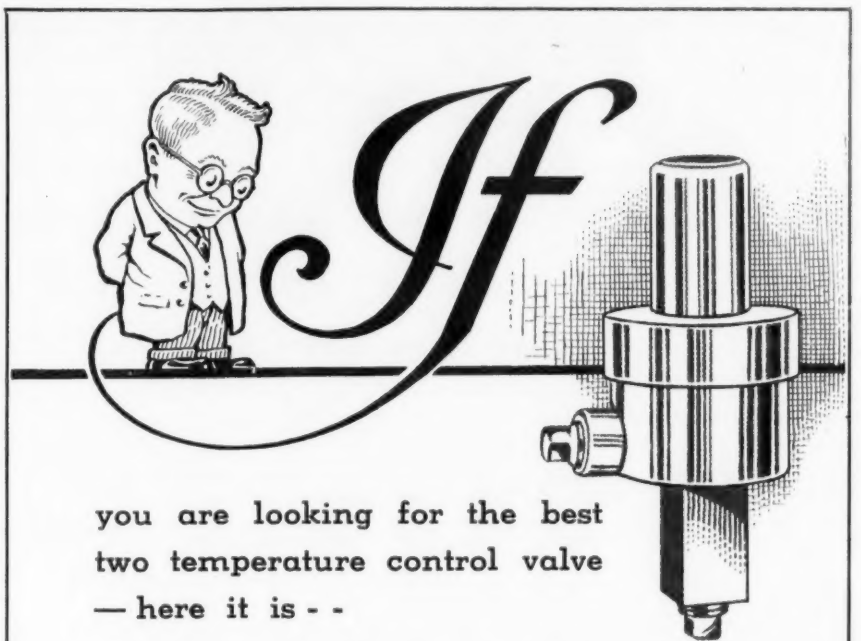
Doubleday-Hill Co. Handles F-M Refrigerators

BALTIMORE—Doubleday-Hill Electric Co., Atwater Kent radio distributor here, was recently appointed distributor for Fairbanks-Morse refrigerators in both the Baltimore and Washington territories.

This will be the first time that F-M refrigerators have been represented by a distributor in this area. Headquarters of the organization are in Washington.

New Leonard Dealer Is Appointed in Camden

CAMDEN, N. J.—Klein Stove Co., Leonard refrigerator distributor, recently named Joseph Ruttenberg & Sons, Inc., as a Leonard dealer here.



you are looking for the best two temperature control valve — here it is —

The same type of valve responsible for the remarkably accurate control of temperature in the Temprite Cooler is now available for general commercial work.

Write for particulars

TEMPRITE PRODUCTS CORPORATION
1349 EAST MILWAUKEE AVE. - DETROIT, MICHIGAN
ORIGINATORS OF INSTANTANEOUS LIQUID COOLING DEVICES



MODEL WAV 2000
(20 TONS)

NEW PRODUCTS—NEW OPPORTUNITIES!

Servel's new "V" line of 15 and 20-ton machines opens up new fields for the aggressive distributor. These big, sturdy machines solve the Air Conditioning problem for the largest restaurants, ready-to-wear shops and offices.

Servel now offers twelve distinct machines designed especially for Air Conditioning and ranging from 1/2 ton to 20 tons in capacity. Every model is correctly balanced—full capacity, full efficiency—and all are priced within the reach of today's buyer.

Complete details on request.

SERVEL
COMMERCIAL REFRIGERATION

SERVEL, INC. Commercial Refrigeration Division EVANSVILLE, IND.

This modern 33-acre plant is the home of Servel Commercial Refrigeration and the world-famous Electrolux, the Servel Gas Refrigerator



There is no Substitute for Experience



UNIVERSITY OF WISCONSIN TESTS FURNISH HOUSEHOLD ELECTRIC REFRIGERATOR PERFORMANCE DATA

Tests Show Current Consumption And Temperatures Maintained Under Various Conditions

By Royce E. Johnson, Assistant Professor of Electrical Engineering and Director of Electrical Standards Laboratory, University of Wisconsin.

IN A mechanism as complicated as the common household refrigerator it would seem logical to expect that there would be considerable difference in performance of machines of various makes. That there are definite differences was shown by a test of several months' duration which was completed within the past year by the Electrical Standards Laboratory.

The test was made to determine over-all performance, rather than component part performance, inasmuch as the user is generally interested in the complete machine, its initial and maintained efficiency and its refrigerating capacity.

Considering the magnitude of the investment in refrigerators and annual energy consumption of the approximately 7,250,000 household refrigerators in use in this country, it is rather surprising that practically no tests have been conducted for public or semi-public information.

It is still more surprising that little has been done to establish definite standards for test conditions and procedure which adequately determine refrigerator performance under service conditions both when new and after several years of service.

Since there were no officially approved standards for testing the complete household refrigerators, various tentative and suggested test specifications were analyzed and cor-

related to serve as standards of procedure for the test.

Refrigerator performance depends so much on loading and ambient conditions that a statement of results only might well be misleading. For that reason, and also to indicate the rigidity of conditions necessary to secure results which can be checked with reasonable accuracy, the test conditions and measuring methods are briefly described.

Test Conditions and Measuring Methods

1. Ambient temperature variations did not exceed plus or minus 0.5° F. during a test run.

2. Vertical temperature gradients less than 0.5 F. per foot.

3. Temperature differences in various parts of the room at 3 feet above floor within plus or minus 1° F.

4. No drafts on refrigerators exceeding 25 feet per minute air velocity.

5. Each refrigerator placed in its own 7-foot high booth with adequate separation between booths, hollow tiles beneath booths and 10 feet clearance between top of booths and ceiling for air circulation. Refrigerator was placed 3 inches from the back of booth and 6 inches from sides.

6. Test room (hollow tile walls and concrete floor) was surrounded on all sides by spaces at approximately 10°

below ambient temperature to absorb the heat from the refrigerators and still have no cold surfaces in test room.

7. Temperatures were measured in the refrigerators with thermocouples calibrated before and checked after the test. Sensitivities were 0.2° F. A special potentiometer circuit in which stray contact and thermal e.m.f.'s were minimized was used for measuring thermocouple electromotive forces. Air temperatures in the refrigerators were measured with thermocouples imbedded in iron cubes having the heat capacity equivalent to 15 grams of water.

8. Energy measurements were made by watt-hour meters readable to at least 0.01 kwh.

9. Gas consumption was measured by a "wet meter" sensitive to 0.001 cubic foot, backed up by two ordinary gas meters for integrating purposes.

10. Operation records were obtained on a twenty pen strip-chart recorder.

11. Total running time was integrated by a synchronous motor-driven minute counter connected to each of the 15 electric refrigerators.

12. Humidity measurements were made with wet and dry bulb thermometers.

13. Ambient temperature measurements were made with mercury in glass thermometers at a number of places in the room. A Leeds and Northrup recording resistance thermometer, sensitive to 0.02° F., made a graphic record of the temperature at one location and functioned to maintain the ambient temperature constant.

14. Ambient temperatures of 70, 90, 100, 110, 115, and 120° F. were used.

15. Relative humidity generally was kept above 75% and frequently was above 85%.

16. Loads for which energy requirements were obtained are designated below as "A," "B," and "C." The "C" runs or loads are based on a 24 hour cycle. "A" and "B" loadings generally were for a longer period.

Loads

The loads were:

"A." No food or other load, refrigerator running with door closed.

"B." Fifty B.t.u. per hour heat load in food space of regular refrigerators: 25 B.t.u. in chests. Heat was turned on at 12 hours before taking data. Heat was supplied by 8 feet of asbestos insulated heater wire spread around on the lower food shelf.

"C." Door opening and ice making in addition to "B" load above. Door opened for 15 seconds every five minutes from 8-9 a. m., 11-12 a. m. and 3-4 p. m., plus one opening at 12:15 p. m. for charging with 4 pounds (only 2 pounds in chests) of water, making a total of 40 openings in the run (24 hours).

The ice was removed about 11:20 a. m. during one of the regular 15 second openings: the trays emptied and charged with water at 70° F. $\pm 4^\circ$ F. just before they were replaced at about 12:15 p. m.

"D." Door opened as for "C," but with no heat or ice making load.

The trays of the standard types of refrigerators contained a total of

4 pounds of ice at the beginning of each run. The chests had only 2 pounds of ice.

Refrigerators Tested

The refrigerators were selected at random from dealers' or jobbers' stocks. In general, only one machine of each make and model was tested.

It was not believed necessary to test a number of refrigerators of each kind because with any degree of adequate factory inspection there should not be much difference between cabinets, compressors or other parts in a given line of machines.

Furthermore, if inspection standards in a factory are so poor that occasionally a sub-standard machine costing a hundred dollars or more is passed, the whole line could reasonably be regarded with suspicion, if not condemned.

Some of the important features of

the various refrigerators tested are listed in Table I. Refrigerators of one make are designed by the same number, a letter being affixed to identify other machines of the same make.

Before beginning the test the refrigerators were operated for two weeks during which thermostat settings were adjusted and the measuring and recording devices tested out.

At the end of the first week of operation service men from the various dealers were called in to check the operation of their respective machines. In a case where the refrigerator did not seem to perform as it should, the service man made subsequent adjustments until he thought it was operating satisfactorily.

Test Results

Refrigerator power requirements appear to be of more concern to most (Continued on Page 15, Column 1)

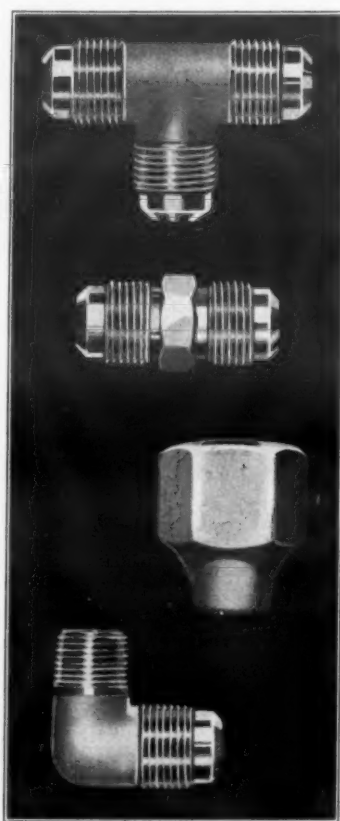
Table I - Construction Features

| No. | Nominal Vol. | Year Model | Type | Insulation | | Type of Unit | Refrigerant |
|-----|--------------|------------|---------|--------------|--------------------|--------------|---|
| | | | | Material | Wall Thickness-In. | | |
| 1 | 6 | 1934 | Cabinet | Dry Zero | 3.4 | Conventional | SO ₂ |
| 1A | 6 | 1934 | Cabinet | Dry Zero | 3.4 | Conventional | SO ₂ |
| 2 | 5.5 | 1934 | Cabinet | Dry Zero | 2.1 | Conventional | SO ₂ |
| 3 | 6.1 | 1934 | Cabinet | Alfol | 2.25 | Sealed | C ₂ Cl ₂ F ₄ |
| 4 | 6.5 | 1934 | Cabinet | Corru. Paper | 2.75 | Conventional | SO ₂ |
| 5 | 7 | 1934 | Cabinet | Corru. Paper | 2.9 | Sealed | HCOOCH ₃ |
| 5A* | 7 | 1935 | Cabinet | Corru. Paper | 2.9 | Sealed | SO ₂ |
| 5B | 2 | 1934 | Chest | Corru. Paper | 2.6 | Sealed | SO ₂ |
| 6 | 5.5 | 1934 | Cabinet | Balsam Wool | 3.5 | Conventional | SO ₂ |
| 7 | 6.2 | 1934 | Cabinet | Balsam Wool† | 3.4 | Sealed | SO ₂ |
| 7A* | 6.2 | 1935 | Cabinet | Balsam Wool† | 3.4 | Sealed | CCl ₂ F ₂ |
| 8 | 6 | 1934 | Cabinet | Balsam Wool | 3.4 | Conventional | CH ₂ Cl ₂ |
| 9 | 5.3 | 1934 | Cabinet | Corru. Paper | 2.9 | Conventional | SO ₂ |
| 9A | 2 | 1934 | Chest | Corru. Paper | 2.0 | Conventional | SO ₂ |
| 10 | 5.4 | 1934 | Cabinet | Dry Zero | 2.75 | Sealed | CH ₂ Cl ₂ |
| 11 | 6 | 1934 | Cabinet | Temlock | 3.25 | Sealed | NH ₃ |

*1935 unit in the old cabinet.

†Celotex and Temlock used in addition to Balsam Wool.

STANDARDS



To obtain perfection in industry or any branch of it, the adherence to a rigid code of standards is imperative. . . . The refrigeration industry depends for its continued growth on the absolute maintenance of precise manufacturing limits on all the components forming a part of a complete assembly.

In the matter of fittings, for instance, the question of close fit, exact angle of tube seats and seepage proof quality of metals is of the utmost importance. Failure in any of these fundamental requirements condemns the job on which they are installed.

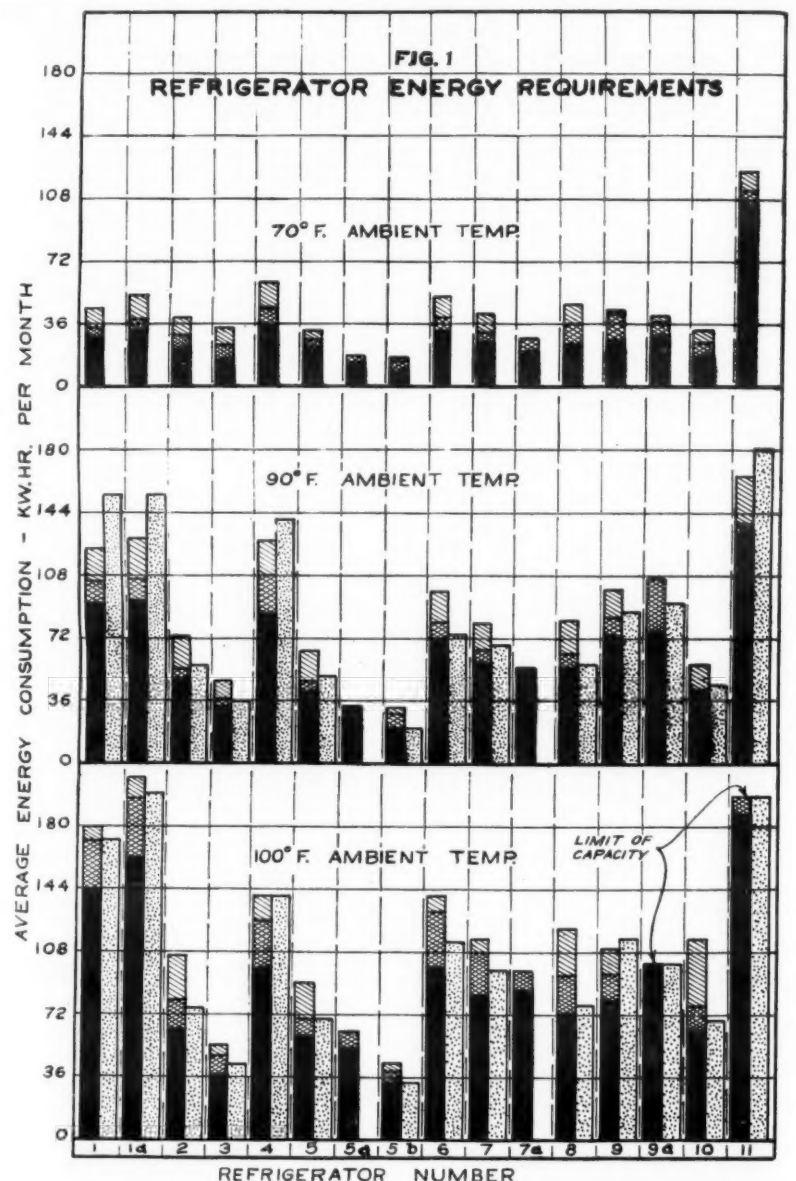
Being specialists in the production of fittings for refrigeration purposes Commonwealth Brass Corporation fully appreciates the part that correct design and manufacturing play in the satisfaction of ultimate users.

Ever since the birth of the industry Commonwealth has produced Fittings.

BUILT RIGHT TO STAY TIGHT

COMMONWEALTH BRASS CORP.

Commonwealth at Grand Trunk R.R.
DETROIT, MICH.



| SYMBOL | LOAD | KIND OF LOAD | DATE OF RUN | | |
|--------|------|----------------------------|-------------|----------|-----------|
| | | | 70° AMB. | 90° AMB. | 100° AMB. |
| ■ | A | NO LOAD | 11/22/34 | 11/8/34 | 10/15/34 |
| ▨ | B | INCREMENT DUE TO HEAT LOAD | 11/27/34 | 11/10/34 | 10/29/34 |
| ▩ | C | DOOR OPENING + ICE MAKING | 11/24/34 | 11/11/34 | 10/27/34 |
| □ | A' | LATER, NO LOAD | NONE | 1/24/35 | 1/6/35 |

NOTES: 1. REFRIGERATORS NOS. 5A AND 7A TESTED IN APRIL, 1935.
2. REFRIGERATOR NO. 11 OPERATED ON 520 B.T.U. GAS.
TO OBTAIN CUFT. OF GAS PER MONTH, MULTIPLY KW.HR. SCALE BY 20.

Data for Fig. 1 - Refrigerator Power Requirements

(Average W. Hr. per Hour or Watts)
Average temperatures in cabinets (except for Nos. 9, 9A, and 11) were 43° to 45° F. for "A" loading at 100°, 90°, and 70° ambient. Thermostats not changed for "B," "C," and "D" loads from "A" setting for the same ambient temperature. Thermostats set for 110° ambient "A" load so as to produce 43° to 45° at 100° ambient (except for Nos. 9, 9A, and 11). See Table II for food compartment temperatures at 110° ambient.

Average Power Required, Watts (B.t.u. per hour for No. 11)

| Hours of Operation | 28 | 71 | 180 | 48 | 24 | 24 | 112 | 32 | 20 | 24 | 40 | 72 | 24 |
|--------------------|--------|--------------|----------|----------|----------|-------------|---------|---------|----------|-------------|----------|----------|----------|
| Type of Load | A | A | A | B | C | D | A | A | B | C | A | B | C |
| Date of Test | 2/3/34 | 1/6/35 | 10/15/34 | 10/29/34 | 10/27/34 | 10/21/34 | 1/24/35 | 11/8/34 | 11/10/34 | 11/11/34 | 11/22/34 | 11/27/34 | 11/24/34 |
| Refrigerator | 110° | | | | | | | | | | | | |
| Number | Amb. | 100° Ambient | | | | 90° Ambient | | | | 70° Ambient | | | |
| 1 | 290 | 239 | 200 | 250 | 244 | 205 | 215 | 128 | 141 | 172 | 40 | 47 | 63 |
| 1A | 325 | 276 | 225 | 273 | 288 | 240 | 215 | 131 | 148 | 180 | 46 | 55 | 73 |
| 2 | 148 | 105 | 88 | 111 | 147 | 116 | 79 | 68 | 77 | 102 | 30 | 41 | 55 |
| 3 | 86 | 60 | 51 | 66 | 75 | 65 | 45 | 50 | 52 | 66 | 21 | 34 | 47 |
| 4 | 207 | 194 | 137 | 175 | 195 | 164 | 194 | 120 | 150 | 178 | 46 | 63 | 83 |
| 5 | 109 | 96 | 83 | 96 | 125 | 106 | 70 | 57 | 66 | 90 | 32 | 38 | 45 |
| 5A* | ... | 86 | ... | 72 | ... | ... | 46 | ... | ... | ... | 19 | 25 | ... |
| 5B | 61 | 44 | 45 | 55 | 48 | 62 | 29 | 28 | 40 | 45 | 12 | 21 | 23 |
| 6 | 203 | 156 | 137 | 181 | 193 | 160 | 102 | 99 | 112 | 136 | 45 | 55 | 71 |
| 7 | 173 | 135 | 115 | 149 | 160 | 143 | 94 | 80 | 90 | 111 | 34 | 43 | 58 |
| 7A* | ... | 118 | ... | 135 | ... | ... | 76 | ... | ... | ... | 28 | 38 | ... |
| 8 | 143 | 107 | 100 | 131 | 168 | 131 | 78 | 75 | 87 | 113 | 34 | 49 | 65 |
| 9 | 183 | 160 | 110 | 131 | 152 | 126 | 120 | 102 | 117 | 138 | 36 | 66 | 66 |
| 9A | 148 | 142 | 141 | 142 | 138 | 140 | 127 | 105 | 148 | 145 | 41 | 52 | 57 |
| 10 | 177 | 94 | 86 | 106 | 160 | 116 | 63 | 50 | 59 | 78 | 24 | 35 | 45 |
| 11† | 2985 | 2500-3800 | 2700 | 2900 | 2900 | 2900 | 2690 | 1930 | 1980 | 2380 | 1500 | 1620 | 1790 |

*Refrigerators No. 5A and 7A tested in April, 1935. These were 1935 model units tested in the 1934 cabinets previously tested.

†Burner would not take recommended amount of gas at recommended pressure when test started. Pressure was subsequently raised but additional B.t.u. per hour made no noticeable decrease in cabinet temperature until more than 3,300 B.t.u. per hour were used (at 100° ambient). Gas in excess of 3,300 B.t.u. per hour raised temperature in food compartment.

Results of Tests Show Importance of Good Cabinet Sealing and Proper Insulation

(Continued from Page 14, Column 5)

householders than any other factor, judging by requests for information. The average kilowatt-hours per month required by the refrigerators for several degrees of loading are shown in Fig. 1. Note that refrigerator No. 11 used gas and that the kwh. ordinates in Fig. 1 must be multiplied by 20 to obtain the cubic feet per month of 520 b.t.u. per cubic foot gas for this refrigerator.

Thermostats were set to produce an average food space temperature of between 43° and 45° F. in each refrigerator (with a few exceptions as noted below) with "A" loading at each ambient temperature. The settings were not changed for other loads at the same ambient temperature, although the average food space temperatures increased due to the heat load, opening load, and the ambient temperature.

In normal usage thermostats are not set in the daytime for lower temperatures than are desired during the night after the contents are cooled. An average food space temperature of 43°-45° F. during this period—corresponding to load "A" conditions during the test—generally keeps the contents cool enough during the day.

At this point it may be well to recall that the temperature sensitive element of a thermostat is located on the evaporator or cooling coil, generally in such a position that it is not greatly influenced by air temperature.

It follows that in hot weather it will be necessary to use a colder thermostat setting than in cold

weather for the same food temperatures. For example, decreasing the ambient temperature from 90° to 70° F. lowered the food space temperatures over a range 3° to 9° F. with "A" loading and no thermostat change.

Referring again to Fig. 1, the exceptions previously mentioned parenthetically were for load "A" runs at 100° F. ambient. Refrigerator No. 11 could not be cooled below 47° F. on the initial or final load "A" run, No. 9 because the thermostat could not be set lower and No. 9A because it had insufficient capacity.

On account of insufficient capacity, several refrigerators after 2.5 months showed less increase in energy requirements at 100° F. ambient than at 90° F. The increase in energy requirements at 90° F. ambient would have been somewhat greater for some machines had the first 90° F. run been made three weeks earlier. The humidity was high during most of the 3-week period following the first 100° F. ambient run.

The effect of door opening load only in a 100° F. ambient room with high humidity can be judged by a comparison of the energy requirements for loads "A" (Oct. 15) and "D" (Oct. 21). It is to be noted that the greatest power increases were in the neighborhood of 30%. The refrigerators having the coldest evaporators, or the type of construction permitting the greatest amount of air exchange and contact with the evaporator while the door was open, would be expected to be, and in general were found to be, most influenced by the door opening load.

It may be of interest to note that

load "D" was repeated on two different days as a check on the consistency of performance, and no refrigerator changed in its average power requirements by more than 2%.

Data which are reported for the various loads were taken during runs which started within one to three days after defrosting the evaporator. The shorter intervals preceded the "C" and "D" load runs. The doors were kept closed in the meantime so as to minimize frost accretion prior to the run.

It was found that under load "A" conditions little change occurred in performance, due to ice on the evaporator, even after operating for a week without defrosting. No tests were made on heavier loads to see just how much effect there was from an ice accumulation on the evaporators. Obviously, however, a week's accumulation of ice, even with door closed, would influence the results for most of the refrigerators for operating under loads "B," "C," or "D."

The refrigerators were kept in operation during the period from Sept. 25 to Feb. 9, exclusive of the interval from Jan. 10 to 21 when they were shut down to permit the motors to absorb moisture. The relative humidity was raised to above 70% on Oct. 12 and held there, except for an occasional day when considerable work had to be done such as installing circuits for the heat load, until the time of weighing on Feb. 9 to determine moisture absorption. The humidity probably did not have time to cause any appreciable insulation saturation before the first load "A" run at 100° F. ambient.

In most cases, judging by the data, the humidity had not yet impaired the insulation effectiveness for the first load "A" run at 90° F. ambient. The data for the "B," "C," and "D" loads at 100° F. and for the "B" and "C" loads at 90° F. ambient, therefore would not show much effect of moisture in the insulation on those refrigerators not impaired at 90° F. ambient.

During the four-week period intervening between the last run at 70° F. ambient and the final run on load "A" at 100° F. ambient, the refrigerators were operated on load "A" at an ambient temperature not accurately controlled but varying between 98° and 107° F. with relative humidity high enough so that all cabinets except "5B" generally had some condensate on them.

Part of the time the humidity was high enough to cause water to run down the sides of the cabinets. No "5B" had less condensate than others; at least partly because it used some of the cabinet surface for condensing purposes, in place of the conventional type of condenser.

The final increased energy requirements, as compared with the first load "A" runs, are due to the decrease in insulating properties of the cabinets and whatever change in efficiency may have taken place in the units. Condensers were checked to be certain they were still free from dirt and lint before making these runs. Evaporators were previously defrosted as usual also. These load "A" runs are subsequently referred to in connection with Table III.

The efficiency of refrigerator No. 10 definitely dropped between the load "A" run on Jan. 6 at 100° ambient and the load "A" run on Jan. 24 at 90° ambient. A recheck of this refrigerator in April when Nos. 5A and 7A were tested gave identical results for load "A" at 90° ambient, but higher results at 100° ambient. This last run at 100° ambient indicated a power requirement 26% greater for load "A" than the initial run Oct. 15. This is the same relative increase as observed for the 90° ambient load "A" run on Jan. 24 as compared with the corresponding run on Nov. 8.

It is evident that refrigerator No. 11 cannot compete in operation cost with the better electric refrigerators unless gas is relatively very cheap.

An idea of the relative reserve capacity of the machines tested can

Table II - Energy, Running Time, and Interior Temperatures with High Ambient Temperatures
(All Data Taken Under Load "A" Conditions)

Thermostats set to produce an average of 45° F. in food space at 100° F. ambient (if there was sufficient capacity) for the 110° F. ambient temperature run. Thermostats in coldest position for 115° and 120° F. ambient runs

| 110° F. Ambient 2/3/35 | | | | | 115 & 120° F. Ambient, Mar.-Apr. '35 | | | | |
|------------------------|------------------------|--------|------------------|--------------|--------------------------------------|--------|------------------|--------------|------------------|
| Ref. No. | Food Space Temp. (°F.) | | Running Time (%) | KWH* per mo. | Food Space Temp. (°F.) | | Running Time (%) | KWH* per mo. | Amb. Temp. (°F.) |
| | Top | Bottom | | | Top | Bottom | | | |
| | 1 | 65 | 53 | 100 | 209 | .. | .. | ... | |
| 1A | 62 | 52 | 100 | 234 | .. | .. | ... | ... | ... |
| 2 | 51 | 46 | 49 | 107 | 40 | 34 | 100 | 192 | 115 |
| 3 | 48 | 49 | 100 | 62 | .. | .. | ... | ... | ... |
| 4 | 63 | 60 | 100 | 149 | .. | .. | ... | ... | ... |
| 5 | 52 | 44 | 62 | 78 | 46.5 | 40 | 100 | 132 | 115 |
| 5A | .. | .. | ... | ... | 51 | 44 | 100 | 105 | 120 |
| 5B | 50 | 46 | 40 | 44 | .. | .. | ... | ... | ... |
| 6 | 55 | 44 | 100 | 146 | .. | .. | ... | ... | ... |
| 7 | 50 | 52 | 100 | 125 | .. | .. | ... | ... | ... |
| 7A | .. | .. | ... | ... | 46 | 48 | 100 | 158 | 120 |
| 8 | 52 | 45 | 73 | 103 | 51 | 42.5 | 100 | 159 | 115 |
| 9 | 60 | 54 | 100 | 132 | .. | .. | ... | ... | ... |
| 9A | 65 | 53 | 100 | 107 | .. | .. | ... | ... | ... |
| 10 | 45 | 49 | 61 | 127 | 44 | 47 | 100 | 220 | 115 |
| 10 | .. | .. | ... | ... | 49 | 54 | 100 | 224 | 120 |
| 11 | 62 | 57 | 100 | 4150 cu. ft. | .. | .. | ... | ... | ... |

*Based on 720 hours per month.

Table III - Frost Accumulation, Moisture Absorption, and Increase in Energy Requirements

| Refrigerator No. | Frost Accumulation, 10 days, 100° F. Ambient grams* | Moisture Absorption Initial Weight lbs. | Increase in 4.5 Months lbs. oz. | Increase in Energy Requirements Load A Over 2.5 mo. Period | |
|------------------|---|---|---------------------------------|--|-------------|
| | | | | 90° Amb. % | 100° Amb. % |
| 1 | 1700 | 238 | 6 — 0 | 68 | 20† |
| 1A | 1300 | 233 | 6 — 8 | 64 | 22† |
| 2 | 300 | 254 | 3 — 14 | 16 | 19 |
| 3 | 65 | 221 | 0 — 0 | 11 | 18 |
| 4 | 570 | 285 | 7 — 3 | 61 | 42† |
| 5 | 195 | 320 | 1 — 5 | 16 | 16 |
| 5B | 50 | 142 | 0 — 4 | 4 | —2‡ |
| 6 | 480 | 266 | 2 — 8 | 3‡ | 14 |
| 7 | 320 | 306 | 3 — 10 | 17 | 17 |
| 8 | 280 | 289 | 2 — 11 | 4 | 7 |
| 9 | 1220 | 278 | 9 — 15.5 | 17‡ | 45 |
| 9A | 170 | 160 | 2 — 6 | 21 | 1† |
| 10 | 340 | 310 | 0 — 12 | 26 | 26** |
| 11 | 540 | 421 | 4 — 10 | 40 | 0† |

*Includes about 45 grams from dehydration test. Door opened twice in this period. Ambient humidity high. Food space at about 45° F.

**Based on load "A" check run on this machine in April.

†Refrigerators ran nearly 100% of the time initially and had insufficient capacity on final run at 100° F. ambient.

‡Probably had become partly saturated before initial 90° F. run, but not before first run at 100° F. ambient.

§Thermostat setting probably not exactly the same for initial and final runs.

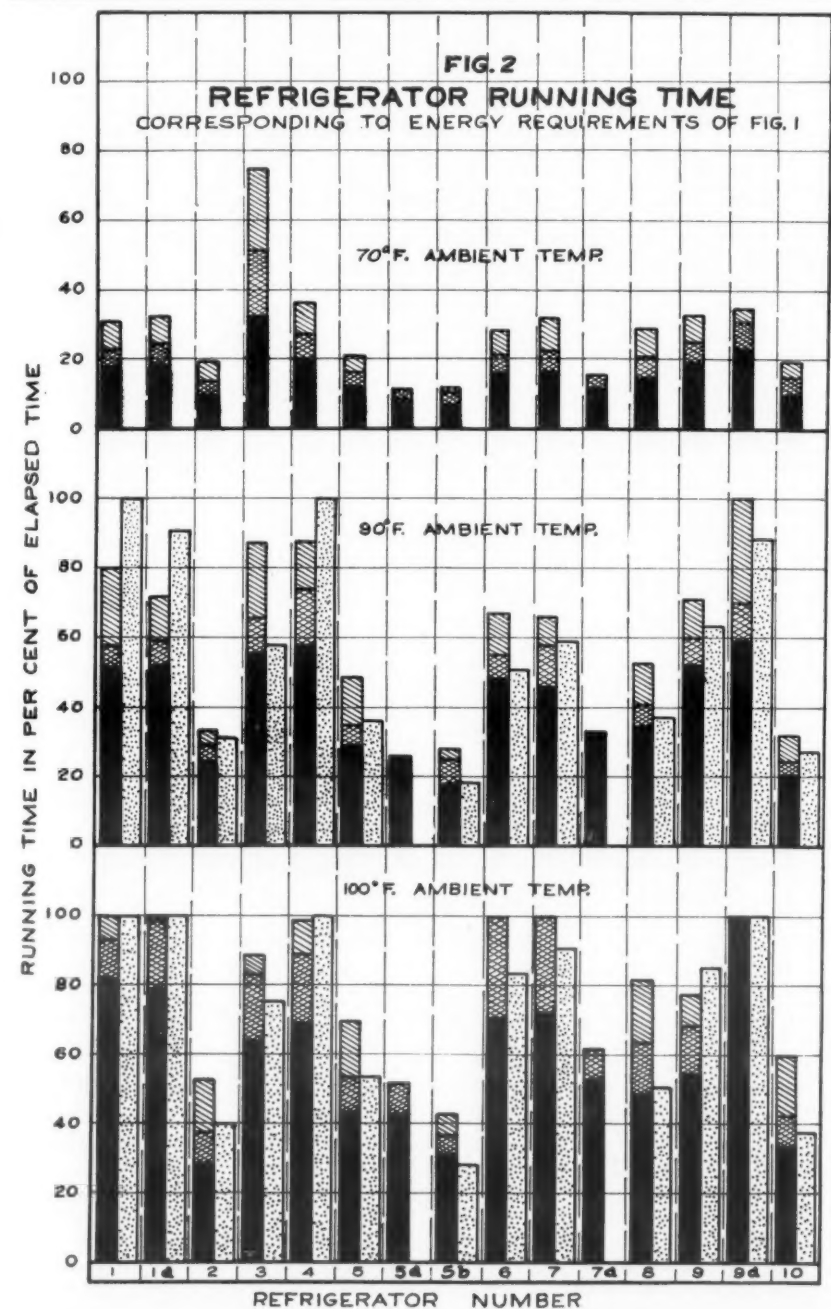
be obtained from Fig. 2, in which are shown the per cent running times corresponding to the energy requirements shown graphically in Fig. 1.

Additional data throwing light on relative refrigerating capacity are included in Table II, in which data are summarized for high ambient temperature conditions. For the 115° and 120° F. ambient temperature conditions, the motors were caused to run continuously, the food space temperatures serving to compare refrigerating ability. Only those refrig-

erators (exclusive of one chest) which had sufficient capacity at 110° F. were run at 115° or 120° F. ambient.

Two factors which make for a permanently efficient household refrigerator, but whose importance is too frequently overlooked, are a well-sealed food space and either a non-hygroscopic insulation or a well-sealed insulation. Waxed or otherwise impregnated paper, commonly called waterproof, is far from being impermeable to moisture.

(Continued on Page 16, Column 1)



Data for Fig. 2 - Refrigerator Running Time

Data Corresponds to Power Requirements in Fig. 1. Expressed in Per Cent of Elapsed Time.

| Type of Load | A | A | A | B | C | D | A | A | B | C | A | B | C |
|---------------------|-----------|--------------|----------|----------|----------|----------|-------------|---------|----------|-------------|----------|----------|----------|
| Date of Test | 2/3/34 | 1/6/35 | 10/15/34 | 10/29/34 | 10/27/34 | 10/21/34 | 1/24/35 | 11/8/34 | 11/10/34 | 11/11/34 | 11/23/34 | 11/27/34 | 11/24/35 |
| Refrigerator Number | 110° Amb. | 100° Ambient | | | | | 90° Ambient | | | 70° Ambient | | | |
| 1 | 100 | 100 | 82 | 93 | 100 | 85 | 100 | 58 | 51 | 80 | 18 | 23 | 31 |
| 1A | 100 | 100 | 79 | 99 | 100 | 84 | 91 | 52 | 59 | 72 | 19 | 25 | 33 |
| 2 | 49 | 40 | 29 | 38 | 53 | 43 | 31 | 24 | 29 | 33 | 10 | 12 | 20 |
| 3 | 100 | 75 | 64 | 83 | 89 | 77 | 58 | 56 | 66 | 88 | 33 | 52 | 76 |
| 4 | 100 | 100 | 69 | 89 | 99 | 85 | 100 | 58 | 74 | 88 | 20 | 27 | 36 |
| 5 | 62 | 54 | 44 | 54 | 70 | 60 | 36 | 29 | 35 | 49 | 12 | 16 | 21 |
| 5A | .. | 43 | .. | 52 | .. | .. | 26 | .. | .. | .. | 9 | 12 | .. |
| 5B | 40 | 29 | 31 | 37 | 43 | 34 | 18 | 18 | 25 | 28 | 7 | 11 | 12 |
| 6 | 100 | 84 | 71 | 100 | 100 | 84 | 51 | 48 | 55 | 67 | 17 | 22 | 29 |
| 7 | 100 | 91 | 72 | 100 | 100 | 91 | 59 | 46 | 53 | 66 | 17 | 23 | 32 |
| 7A | .. | 53 | .. | 62 | .. | .. | 33 | .. | .. | .. | 12 | 16 | .. |
| 8 | 73 | 51 | 49 | 64 | 82 | 63 | 37 | 35 | 41 | 53 | 15 | 21 | 29 |
| 9 | 100 | 85 | 55 | 69 | 78 | 64 | 63 | 52 | 60 | 71 | 16 | 24 | 31 |
| 9A | 100 | 100 | 100 | 100 | 100 | 100 | 88 | 70 | 100 | 100 | 23 | 31 | 75 |
| 10 | 61 | 38 | 34 | 43 | 60 | 46 | 27 | 20 | 24 | 32 | 10 | 15 | 20 |
| 11 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |

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Tests Provide Data on Insulation Leakage, Noise, Exterior Finish, Motor Heating

(Continued from Page 15, Column 5)

Refrigerators No. 4 and 9, for example, were "water-proofed" with impregnated paper covering over the insulation material.

There is an easily noticeable relationship in Table III between maintenance of efficiency and moisture absorption by the insulation.

In order to ascertain how rapidly the insulation might dry out under very favorable conditions, some of the refrigerators were weighed after standing idle in a dry room at from 70° to 85° F. for 18 days following the weight increase measurement. The results for these refrigerators follow:

| Ref. No. | Weight Increase (From Table III) | Weight Decrease In 18 Days |
|----------|----------------------------------|----------------------------|
| 1 | 6 lb. 0.0 oz. | 2 lb. 7.0 oz. |
| 1A* | 6 lb. 8.0 oz. | 0 lb. 9.0 oz. |
| 2 | 3 lb. 14.0 oz. | 1 lb. 3.0 oz. |
| 4 | 7 lb. 3.0 oz. | 4 lb. 3.0 oz. |
| 6 | 2 lb. 8.0 oz. | 0 lb. 8.5 oz. |
| 8 | 2 lb. 11.0 oz. | 1 lb. 0.5 oz. |
| 9 | 9 lb. 15.5 oz. | 3 lb. 14.0 oz. |

*Had been run a few days in the ideal period.

In normal service, the insulation would never have even this opportunity to dry out. As an indication of what a little operation would do to prevent drying out, the case of No. 1A can be cited. This was a refrigerator practically identical to No. 1. Refrigerator No. 1 was not operated at all in the 18-day interval while No. 1A was operated a few days about the middle of the period.

Table III also contains data on frost accumulation on the evaporators. The doors were opened only twice in the ten day period covered. During this time two 30-gram hamburger samples and one 50-gram water sample were kept refrigerated for 96 hours with nearly the same amount of dehydration (about 45% weight loss from the hamburger and 30% from the water) in each refrigerator. This accounts for about 45 grams of the frost melted off at the end of the ten day period. Incidentally, all hamburger specimens were refused by a dog after the four day storage period.

There is a general relationship be-

tween refrigerator energy requirements as given in Fig. 1 and the amount of frost accumulation. It happens also that the refrigerators having the greatest increase in energy requirements over a period of time accumulated considerable frost on their evaporators. The large frost accumulations indicate that the food space is not well sealed.

Poor sealing of the food space can easily be due to a poor fit around the door. This was checked by the service men in most cases after the first week of operation and rechecked after a month or so as part of the test procedure. What air circulation there may have been past the door of any refrigerator was unavoidable and due to construction rather than faulty adjustment of the door.

Table V contains data on typical cabinet temperatures for loads "A" and "B." The thermocouples placed in air were lagged heavily enough (equivalent of 15 g. water) so that their temperature changed very little during the on and off periods at the higher ambient temperatures.

At 70° F. ambient, the off periods were longer and there was a few degrees variation in thermocouple temperature. Averages are given.

In refrigerators No. 7 and 10 the horizontal distance between the evaporator and side wall was so small that the top thermocouple was apparently cooled to some extent by direct radiation to the evaporator. Had there been food containers or a shield between the thermocouple and evaporator this would not have happened.

Table VI contains miscellaneous temperature data. The maximum observed motor temperatures are not necessarily, all by themselves, significant. However, if all motors had the same grade of insulation and type of construction, it would seem as though the hottest running ones might not have as long a trouble-free life.

Evaporator and ice tray temperatures for the first observations just before beginning the door opening run (Table VI) indicate which refrigerators might be expected to be most economical of energy or else of inadequate capacity.

Table V - Typical Cabinet Temperature for Loads 'A' and 'B'

(Thermostats Not Changed from "A" Load Setting for the "B" Loading.)
(Thermostats Set the Same for 100° and 110° F. Ambient.)

| Load | A | | A | | B | | A | | B | | A | | B | |
|---------------------|-----------|---------|--------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|-------------|--------|
| | *Top | *Bottom | Top | Bottom | Top | Bottom | Top | Bottom | Top | Bottom | Top | Bottom | Top | Bottom |
| Refrigerator Number | 110° Amb. | | 100° Ambient | | 90° Ambient | | 80° Ambient | | 70° Ambient | | 60° Ambient | | 50° Ambient | |
| 1 | 65 | 53 | 50 | 39 | 54 | 45 | 48 | 39 | 52 | 45 | 48 | 43 | 52 | 51 |
| 1A | 62 | 52 | 49 | 39 | 53 | 45 | 50 | 41 | 55 | 46 | 47 | 41 | 51 | 48 |
| 2 | 51 | 46 | 45 | 41 | 51 | 51 | 46 | 43 | 52 | 52 | 45 | 43 | 49 | 52 |
| 3 | 48 | 49 | 45 | 44 | 51 | 54 | 45 | 44 | 49 | 52 | 46 | 44 | 44 | 49 |
| 4 | 63 | 60 | 47 | 42 | 52 | 52 | 46 | 42 | 48 | 49 | 44 | 43 | 46 | 51 |
| 5 | 52 | 44 | 46 | 41 | 52 | 48 | 47 | 44 | 51 | 49 | 45 | 43 | 49 | 48 |
| 5B | 50 | 46 | 45 | 41 | 50 | 45 | 45 | 41 | 58 | 55 | 43 | 41 | 59 | 55 |
| 6 | 55 | 44 | 48 | 39 | 51 | 43 | 49 | 40 | 54 | 47 | 47 | 42 | 51 | 47 |
| 7 | 50 | 52 | 42 | 43 | 42 | 49 | 45 | 46 | 48 | 53 | 43 | 43 | 48 | 50 |
| 8 | 52 | 45 | 48 | 40 | 51 | 50 | 47 | 42 | 50 | 59 | 44 | 41 | 46 | 47 |
| 9 | 60 | 54 | 50 | 42 | 52 | 48 | 47 | 40 | 50 | 46 | 42 | 39 | 46 | 44 |
| 9A | 65 | 53 | 48 | 42 | 52 | 45 | 50 | 44 | 57 | 50 | 46 | 43 | 55 | 50 |
| 10 | 45 | 49 | 42 | 46 | 48 | 54 | 44 | 47 | 51 | 56 | 40 | 42 | 44 | 51 |
| 11 | 62 | 57 | 49 | 44 | 61 | 63 | 48 | 45 | 52 | 49 | 45 | 44 | 49 | 51 |

*Temperature measured 5 inches from top and 1½ inches from bottom of cabinet.

Table VI - Temperatures of Motor, Evaporator, And Ice Tray During Load 'C' Run at 100° Ambient

(Motor temperatures were highest observed, other reported for definite times. Door opening 8-9 a.m., 11-12 a.m., 3-4 p.m. Heat load turned on the day before starting this run.)

| Refrigerator Number | Motor Temp. °F. | Evaporator† | | | Coldest Ice Tray | |
|---------------------|-----------------|-------------|--------|-----------|------------------|-----------|
| | | 8 a.m. | 9 a.m. | 9:45 a.m. | 8 a.m. | 9:45 a.m. |
| 1 | 141 | 7 | 18 | 12 | 4 | 11 |
| 1A | 139 | 2 | 27 | 3 | 3 | 8 |
| 2 | 141 | 8 | 3 | 0 | 8 | 0 |
| 3 | 155† | 29 | 32 | 14 | 18 | 14 |
| 4 | 137 | 8 | 16 | 13 | 14 | 22 |
| 5 | 147† | 16 | 19 | 10 | 12 | 10 |
| 5B | 139 | 9 | 16 | 6 | 11 | 15 |
| 6 | 154 | 10 | 27 | 14 | 1 | 6 |
| 7 | 145† | 8 | 24 | 19 | 1 | 9 |
| 8 | 144 | 3 | 5 | 1 | -1 | 0 |
| 9 | 130 | 7 | 15 | 8 | 2 | 3 |
| 9A | 131 | -3 | 7 | -3 | 12 | 16 |
| 10 | 179† | 17 | 12 | 10 | 14 | 12 |
| 11 | 109* | 21 | 29 | 25 | 16 | 21 |

*Burner exhaust at top of exhaust pipe.

†Thermocouple placed outside of motor enclosure on sealed unit.

‡Some thermocouples were not located on the coldest spot because of the difficulty of securing them in place. The ice tray temperatures are therefore more significant.

Whichever is the colder—evaporator or ice tray—can be used as the criterion. The warmer the evaporator can be maintained, other things being equal, and still have proper food space temperature, the better should be the efficiency.

Data given elsewhere indicate that at 100° F., refrigerator No. 11 had insufficient capacity, and that Nos. 3, 5, and 10 of the cabinet type had the best efficiency as well as sufficient capacity. These four machines, it will be observed, had the highest evaporator (as measured by the coldest ice tray) temperatures.

Two other refrigerators, Nos. 2 and 8, had ample capacity. In fact, No. 2 had more, judging by the cabinet temperatures in Table II, than the others. The evaporators of Nos. 2 and 8, however, operated at rather low temperatures in order to cool the cabinet.

The combination of low evaporator temperatures and ample capacity with moderately good efficiency would seem to indicate an efficient and powerful unit in a non-to-well insulated cabinet.

Cabinet temperatures at the beginning of the load "C" runs and at significant intervals thereafter are listed in Tables VII, VIII, and IX for ambient temperatures of 100°, 90°, and 70° F. It is apparent that the cabinet type refrigerators which had the greatest ability to cool the cabinet at 115° F. ambient (Table II) also maintained, with the exception of No. 8, the lowest cabinet temperatures immediately after the ice making and door opening part of load "C" (4 p.m.) at 100° ambient (Table VII).

The temperatures are given at stated hours. Obviously they could not be measured simultaneously without many recording instruments. The system used was to start the refrigerators on the load "C" and "D" runs at one-minute intervals, thereby, in effect, using 14 different time systems displaced from each other by one-

minute intervals. Eight o'clock for one refrigerator would be 8:05 for another, 8:06 for still another, etc.

Table X reveals two refrigerators with inadequate thermostats to make available all the capacity of the refrigerating unit. These are number 1 and 1A. In order to cover the ambient range from 70° to 100° F., it was necessary to remove the thermostat knobs and reset them to increase the thermostat range.

This is not difficult although on No. 1 it is easy to get the parts out of alignment with consequent damage, or at least malfunctioning. On both No. 1 and 1A, the screw which has to be removed is connected to the electrical circuit making it advisable to disconnect the motor before working on the thermostat control. The screw is covered with a small insulating disc which, when pried out, is easily lost. This screw is in the center of the front of the thermostat knob. In going from 100° to 70° the knobs had to be set in the opposite direction.

The thermostat knob on No. 9 needed resetting but the local dealer did not want to send a service man to do it. It was reset as far back as possible (8 points or divisions) by the writer, but even this did not permit it to be advanced sufficiently to get the food space temperature down to 45° after a few months' service.

The thermostat knob on No. 2 had to be set back initially in order to get range enough to give 45° in a 100° room, but no subsequent changes were necessary to handle room temperatures from 70° to 100° and probably 110°.

The thermostat knob on No. 4 also had to be set back initially about one whole turn.

Nos. 1, 1A, 4, and 9A ran all of the time at the settings shown during the last part of December, so that further thermostat advancements could pro-

duce no lower temperatures. No. 7 was on the verge of this condition but it still had an average temperature two degrees below 45°.

Miscellaneous Observations

Unusual ice making ability is sometimes an important item, although often overstressed. Observations on freezing speed were made at several ambient temperatures, but the results are not satisfactorily comparable in that tray dimensions are so different as to greatly affect freezing speeds. None of the refrigerators tested was found especially outstanding in freezing ability.

Refrigerators with four shallow trays, all equipped with aluminum separators or partitions to make small ice cubes, will freeze a given quantity of water, other things being equal, much faster than one with only two deep trays making large cubes. Rubber cube partitions greatly increase freezing time but avoid considerable loss of ice in removing it.

Aluminum ice cube partitions, constructed with the bottom of the partition thick enough to make tapered ice blocks, function to remove the heat rapidly and also to warm up readily when removing the ice. Refrigerated shelves in the evaporator greatly assist in promoting rapid freezing on the shelves.

The thin aluminum shelves which sometimes are removable from the evaporator do not readily conduct heat from a tray of water to the evaporator and its refrigerant, but are desirable in that they can be removed to make space for rapidly cooling a large piece of meat or several cans or bottles.

A convenient food space arrangement found in very few refrigerators is that which can be obtained by placing the drip tray far enough below the evaporator to provide a meat storage space in the tray. Cold air passes down into the tray providing a cold, or even freezing, location for food.

Noise from a refrigerator can be very annoying. With the gradual development of noise consciousness on the part of the public, this phase of appliances will receive more attention. Six observers were used to compare the amounts of noise produced by the refrigerators.

Human observers were believed to be more reliable under the circumstances than acoustimeters, which have to be used with discretion.

A summary of the noise observations is contained in Table IV, which also covers a few other observations. There were no great differences between the ratings made by the several observers, who worked independently of one another.

In humid climates, such as are present in the Gulf states and also existed in the test room (one's trousers stuck to the skin in about two minutes),

(Concluded on Page 17, Column 1)

Table IV - Electrical Insulation Leakage, Noise, And Exterior Finish

| Ref. No. | Leakage* Current Amperes | Average Noise Units† | Exterior Finish‡ | Condition of Finish at End of Test |
|----------|--------------------------|----------------------|----------------------|------------------------------------|
| 1 | .0156 | 25 | S.D.O. | Slightly yellow—O.K. |
| 1A | .005 | 25 | Slightly yellow—O.K. | |
| 2 | .008 | 41 | Baked lacquer | Checked, discolored, rusted |
| 3 | .0012 | 27 | S.D.O. | Slightly yellow—O.K. |
| 4 | .0132 | 37 | Baked lacquer | Checked—rough spots |
| 5 | .0006 | 32 | S.D.O. | Slightly yellow—O.K. |
| 5B | .0007 | 19 | S.D.O. | Slightly yellow—O.K. |
| 6 | .0057 | 80 | S.D.O. | Slightly yellow—O.K. |
| 7 | .0018 | 50 | S.D.O. | Slightly yellow—O.K. |
| 8 | .0014 | 49 | S.D.O. | Slightly yellow—O.K. |
| 9 | .006 | 61 | Lacquer | Rough spots |
| 9A | .0057 | 76 | ..... | Slightly yellow—O.K. |
| 10 | .0022 | 61 | S.D.O. | Slightly yellow—O.K. |
| 11 | .0009 | 3 | S.D.O. | Slightly yellow—O.K. |

*With 110 volts impressed on the insulation.

†Noise units are arbitrary. No. 7 was taken at 50 units and the others compared to it.

‡S.D.O. indicates a synthetic drying oil of which Dulux, Glyptal, and Porceloid are examples.



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(1) More than 1500 Coils for Walk-in Coolers, (2) Three types of Unit Coolers, (3) "AIRLATOR" Drip-Pan Coils, (4) More than 2700 Display Case Coils, (5) Complete Listings of Small Box Coils, (6) Sheet Coils, (7) Commercial Ice Cube Makers, (8) Bottle Cooling Coils, (9) Air and Water Cooled Condensers, (10) Domestic Ice Cube Makers.

TRENTON AUTO RADIATOR WORKS

Main Offices and Factory, TRENTON, NEW JERSEY

NEW YORK: 210-212 West 65th Street

PITTSBURGH: 5114 Liberty Avenue

Table VII - Temperatures in Cabinets

Ambient Temperature 100° F., Load "C" (Temperatures are in Deg. F.)

| Ref. No. | 8 a.m. | | 9 a.m. | | 11 a.m. | | 12 m. | | 2 p.m. | | 2:30 p.m. | | 4 p.m. | | 5 p.m. | | 6 p.m. | | 8 p.m. | |
|----------|--------|----|--------|----|---------|----|-------|----|--------|----|-----------|----|--------|----|--------|----|--------|----|--------|----|
| | T* | B* | T | B | T | B | T | B | T | B | T | B | T | B | T | B | T | B | T | B |
| 1 | 54 | 45 | 65 | 57 | 62 | 53 | 69 | 62 | 69 | 63 | 67 | 62 | 75 | 67 | 70 | 64 | 68 | 62 | 64 | 57 |
| 1A | 53 | 45 | 63 | 55 | 58 | 51 | 67 | 60 | 67 | 63 | 64 | 61 | 73 | 67 | 65 | 62 | 63 | 59 | 58 | 53 |
| 2 | 51 | 51 | 59 | 55 | 53 | 52 | 59 | 55 | 55 | 55 | 53 | 53 | 58 | 54 | 54 | 54 | 53 | 52 | 53 | 52 |
| 3 | 51 | 54 | 59 | 61 | 48 | 54 | 64 | 67 | 61 | 64 | 55 | 66 | 64 | 69 | 54 | 62 | 51 | 60 | 47 | 57 |
| 4 | 52 | 52 | 62 | 60 | 53 | 55 | 64 | 62 | 60 | 66 | 60 | 64 | 68 | 70 | 60 | 65 | 60 | 62 | 57 | 58 |
| 5 | 52 | 48 | 62 | 55 | 53 | 49 | 61 | 55 | 57 | 55 | 56 | 53 | 63 | 57 | 56 | 53 | 53 | 50 | 52 | 49 |
| 5B | 50 | 45 | 53 | 48 | 51 | 46 | 55 | 48 | 55 | 50 | 53 | 47 | 54 | 46 | 52 | 46 | 51 | 45 | 50 | 45 |
| 6 | 51 | 43 | 63 | 54 | 55 | 49 | 69 | 59 | 63 | 58 | 59 | 56 | 69 | 61 | 60 | 54 | 58 | 51 | 53 | 47 |
| 7 | 48 | 49 | 57 | 58 | 48 | 58 | 63 | 63 | 57 | 63 | 56 | 63 | 63 | 64 | 57 | 59 | 51 | 53 | 47 | 50 |
| 8 | 51 | 50 | 64 | 57 | 52 | 51 | 64 | 59 | 60 | 58 | 58 | 56 | 69 | 65 | 58 | 58 | 56 | 55 | 52 | 48 |
| 9 | 52 | 48 | 63 | 55 | 56 | 50 | 65 | 57 | 61 | 58 | 61 | 56 | 67 | 60 | 61 | 57 | 58 | 54 | 56 | 53 |
| 9A | 52 | 45 | 53 | 46 | 52 | 45 | 55 | 48 | 57 | 54 | 56 | 53 | 57 | 53 | 55 | 51 | 53 | 50 | 51 | 48 |
| 10 | 48 | 54 | 57 | 57 | 46 | 55 | 58 | 61 | 48 | 60 | 48 | 58 | 60 | 64 | 46 | 58 | 46 | 56 | 46 | 55 |
| 11 | 61 | 63 | 69 | 69 | 64 | 66 | 69 | 70 | 69 | 70 | 68 | 70 | 73 | 73 | 68 | 71 | 68 | 69 | 65 | 67 |

*T Indicates temperature 5 inches from top of food space.

*B Indicates temperature 1½ inches from bottom of food space.

How Operating Costs Vary with Conditions Shown by Test Data

(Concluded from Page 16, Column 5)

electrical insulation resistance may become rather poor. To test this, the refrigerators were allowed to stand idle for 10 days in a 90° F. room with about 80% relative humidity. Leakage currents through the insulation to ground are tabulated in Table IV. This leakage occurs largely in the motor but all circuits in the refrigerator contribute to it.

None of the leakage currents would ordinarily be fatal to a person, but there was sufficient leakage in Nos. 1, 2, 4, 6, 9, and 9A to be at least alarming. An advisable precaution would be to ground the motor frame and compressor.

Exterior finishes on refrigerators may be of several types. Porcelain enamel, if not chipped or cracked, should resist humidity better than the lacquers or synthetic drying oils. Type of finish and some idea of how they weathered the test are contained in Table IV. There is no question but what the synthetic drying oils, which are baked on, are considerably superior to lacquer.

Porcelain enamels are universally used for refrigerator interiors. Not all enamels are acid resisting. Some of them lose their glossy surface after a relatively short exposure to mild acids. Tests were made by pouring vinegar, grape juice, and lemon juice on small areas in the bottom of each refrigerator.

There was very little difference, after a few days, in the effect of these liquids upon the non-acid-resisting enamels. Refrigerators No. 6 and 11 were found to have that type of porcelain enamel. No. 2 was only slightly attacked, and the others were not attacked by the liquids used. These findings were not entirely in agreement with advertised claims.

Conclusions

"How much will it cost per month to run the X refrigerator?" and "Which is the best refrigerator to buy?" are frequent questions which, unfortunately, cannot usually be answered definitely. To answer them at all, information is needed concerning first cost, reliability of both the manufacturer and dealer, and the user's requirements for freezing and cooling service, as well as the average temperature of the room in which the refrigerator is to be placed.

Other factors bearing on the choice of a refrigerator are: freedom from the harmful effects of certain gases, in case of a leak, which may occur in any machine, and one's attitude toward a conventional unit with its possibility of certain minor repair troubles such as seal leaks and belt adjustments as compared with his at-

Table X - Thermostat Settings

Refrigerators Idling (Load "A") (After Two Months or More Operation)

| Ref. No. | Range Marked On Temperature Control† | | | 70° Ambient (Dec. 5) | | 100° Ambient (Dec. 20) | |
|----------|--------------------------------------|--------|------------|-----------------------|-----------------------|------------------------|-----------------------|
| | Coldest | Normal | Warmest | Average Cabinet Temp. | Setting of Thermostat | Average Cabinet Temp. | Setting of Thermostat |
| 1* | QF, 9 | ... | 1 | 45 | 4 | 45 | 9 + 13(1) |
| 2 | 9 | ... | 1, Def. | 44 | Def. | 43 | 6.5 |
| 3 | No marking—Use a wrench | ... | ... | 39 | ... | 43 | ... |
| 4 | 8 | 1, 2 | 1, Def. | 44 | Def. | 47 | 8(2) |
| 5* | 9 | ... | 1 | 44 | 1.5 | 44 | 6 |
| 5B | 9 | ... | 1 | 42 | 1 | 43 | 5 |
| 6 | 8 | 1 | 1, Def. | 45 | Def. | 44 | 5.5 |
| 7 | 1 | ... | 5, E, Def. | 44 | E | 43 | 3.5 |
| 8 | 11 | ... | 1, Def. | 43 | Def. | 45 | 11 |
| 9† | 9 | ... | 1 | 44 | 1 | 45 | 9 + 6(3) |
| 9A | 4c | ... | 4w, Vac. | 45 | 3w | 46 | 4c (2) |
| 10‡ | 6c | 0 | 6w, Vac. | 43 | 6w-Vac. | 47 | 6c |
| 11 | QF, 9 | ... | 1, Def. | 41 | 1 | 45 | 4 |

Vac.—Vacation.

QF—Quick freeze position on thermostat.

Def.—Defrost position on thermostat.

*Has automatic return defrost position on starting switch.

†Some thermostats have scales numbered both ways from zero. The warm end is indicated by a "w" following the number and the cold end by a "c." All thermostats with "defrost" indicated on the scale or range in this column must be manually set to and from "defrost."

‡Defrost position on starting switch but must be returned manually.

§Has quick freeze and defrost switch that resets automatically.

(1) Knob was turned to coldest point, then removed and set back on stud after it had been turned backward a total of 13 divisions on the thermostat scale, and then advanced to 9 again.

(2) Ran 100% of time.

(3) Knob re-set and advanced in same manner as for No. 1.

titude toward a sealed-in mechanism which will have to be replaced in its entirety in case of trouble.

Under present merchandising arrangements, it is usually the dealer who must bear the burden of servicing a refrigerator in case of trouble during the period for which it is guaranteed. It is true that the manufacturer in most cases backs up the dealer on the guarantee, but all the manufacturer does is to furnish a replacement part. The dealer pays the transportation on the parts and does all the work. Consequently it is important to purchase a refrigerator from a reliable dealer.

In only a few cities, where energy is cheap, or average temperatures are low, cost of energy for operation is relatively unimportant. Where energy cost is important, as it ordinarily is, data on the relative energy requirements is of considerable economic value. It would seem to be of some significance that those refrigerators which operated most economically required less service, as a group, than the others and also suffered less depreciation in efficiency.

General Operation & Service Record

Except for refrigerators Nos. 8 and 14, they were all started in operation initially by the representative of the dealer from whom they were purchased. The machines then stood around for a few weeks in a 100° room until the thermocouple and other circuits were completed, when they were again started.

Before starting the machines, on

Sept. 18, the compressor on No. 4 was replaced with a new one, said to have been taken from a stock machine in the local store. The seal on the original compressor had leaked for several days while it was standing in the room at 100°. The service man had no new seal at the time and had to install a whole compressor.

After the machines had been in operation a week they were inspected by their service men as noted below. Each dealer was invited by letter to check over his machine before the test started so that it would show up to good advantage. A log of the inspections follows:

Oct. 1—Ambient temperature 100°:

Refrigerator No. 2 checked by state service man.

90 lbs. head pressure off cycle.

28-29 inches vacuum running.

98 lbs. head pressure running stated to be OK.

No. 8 checked by manufacturer's service man.

108 lbs. pressure on high side.

6 lbs. pressure on low side.

Put in new motor suspension springs. Stated to be OK.

No. 7 checked by dealer's service man.

98 lbs. head pressure running.

No provision for checking low side. Stated to be OK.

No. 6 checked by local jobber's service man.

Said gas pressures were OK.

Put on a Goodrich belt in place of the Goodyear because the latter were generally noisier. Attempted to put the belt on secretly.

No. 10 checked by dealer's service man.

2.5 lbs. head pressure immediately after stopping. No other check necessary. Everything OK.

No. 4 checked by dealer's service man.

Found frost on return line. Adjusted expansion valve for less vacuum; 98-lb. head pressure after adjustment, 7-inch estimated vacuum after adjustment (gauge got broken while attaching it). Thermostat cut out at 11° and in at 24°. Service man thought pressures were OK.

No. 9 checked by dealer's service man.

3 in. + vacuum. 95 lbs. head pressure running. 94+ lbs. head pressure immediately after stopping. 5 in. vacuum immediately after stopping. Stated to be OK.

No. 9A checked by dealer's service man.

7 in. vacuum running. 10 in. vacuum

immediately after stopping. 88 lbs. head pressure immediately after stopping. 90 lbs. head pressure running. Service man complained about inaccessibility of this model. Could find nothing wrong although ran all the time.

No. 5 and 5A—Looked over by local sales manager for the electric company who sold them. He said there were no checks to be made, except door seal, and that everything seemed OK.

Oct. 2, 100° Ambient:

No. 1A—Checked by local service man. Checked door seal. Changed vacuum from 7 in. to 10 in.

No. 4—Local service man adjusted for more vacuum to make it cool the cabinet down to 45° average.

No. 3—Sales manager for local dealer looked it over. Thought everything was OK.

Oct. 3, 100° Ambient:

No. 4—Service man adjusted expansion valve.

Oct. 4, 100° Ambient:

No. 4—Service man adjusted expansion valve and set thermostat control knob back so thermostat could be advanced enough to obtain 45° in cabinet.

No. 2—Under telephone instructions from dealer, set thermostat knob back 4 points.

No. 9—Ditto, dealer did not want to bother with it.

No. 1A—Dealer's service man set thermostat control knob back four points.

Oct. 5, 100° Ambient:

No. 1A—Thermostat knob set back some more by dealer's service man.

Oct. 6, 100° Ambient:

No. 8—Thermostat knob set back four divisions by staff assistant.

Oct. 8, 100° Ambient:

No. 11—Service expert for this territory adjusted thermostat so it would not shut off at all when on coldest position. Could not get below 46° F. for average cabinet temperature previous to this.

Oct. 9, 100° Ambient:

No. 11—Service expert merely turned thermostat to colder setting. Temperature would not go below 46°. Service man wanted more than 3 inches of space between back of cabinet and booth, but desisted when it was pointed out that 3 inches was standard and that he already had more than that because of the ventilating grill built out at the back of the refrigerator. The 3 inches were measured from this grill.

No. 1A—Service man and local store manager looked it over. They stated that they thought their regular-priced machine was better than the competition model on test.

Oct. 10, 100° Ambient:

No. 1—Installed and started by service man.

Oct. 11, 100° Ambient:

No. 7—Had been running more and more the last few days. Finally the fan began to squeak. The fan motor was replaced by local service man. A noticeable decrease in operating time resulted.

Oct. 17:

No. 6—Local jobber's service man checked the door seal and found it OK.

Oct. 25:

No. 9A—Had run continuously since starting. After being called daily for about a week to do something about it, the local dealer finally sent a competent independent refrigerator service man, rather than his own, to check it over. The service man found the valve in the piston head to leak slightly, but said it would not appreciably affect the efficiency. As long as the evaporator ran at from 2° to 4° F. below zero, he thought the unit was OK and that the high temperature (about 46°) in the cabinet was due to cabinet losses. He remarked about the inaccessibility of the mechanism.

Nov. 1, 100° Ambient:

No. 5—Door had opened in night and motor shut off about 6 hours later.

No. 8—Door adjusted to close better.

No. 4—Had sucked in air so that head pressure was over 200 lbs., and it would not refrigerate. Local service man replaced seal on shaft and blew off the air.

Jan. 23, 90° Ambient:

No. 8 stopped 1 a.m., reason unknown. Started up all right when starting button was pushed.

March 11:

No. 9—Leaked gas, probably as an immediate result of the previous few days of idleness in a 115° room. Repaired in shop, but leaked again after two months of idling.

ACKNOWLEDGMENT: The writer desires to express his appreciation for the able assistance rendered by those loyal student assistants—Joe Hogan, Standley Naysmith, James A. Zimmerman, Ralph S. Parker, and especially Herbert W. Flath—without whom this test could not have been completed. The consulting services of Mr. V. M. Murray and the technical assistance of Mr. Ralph R. Benedict were of great value also. The costs of the test and refrigerators were financed by Consumers' Research, Inc.

FILTRINE
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BROOKLYN, N. Y.

Table VIII - Temperatures in Cabinets

Ambient Temperature 90° F., Load "C" (Temperatures Are in Deg. F.)

Door opening 8-9 a.m., 11-12 a.m., 3-4 p.m.: 13 openings per hour, plus equivalent food load of 50 B.t.u. per hour (25 B.t.u. in Nos. 5B and 9A), and 4 lbs. water at 12:10 p.m. (2 lbs. in Nos. 5B and 9A).

| Ref. No. | 8 a.m. | | 9 a.m. | | 11 a.m. | | 12 m. | | 2 p.m. | | 3 p.m. | | 4 p.m. | | 5 p.m. | |
|----------|--------|----|--------|----|---------|----|-------|----|--------|----|--------|----|--------|----|--------|----|
| | T° | B° | T° | B° | T° | B° | T° | B° | T° | B° | T° | B° | T° | B° | T° | B° |
| 1 | 52 | 45 | 62 | 54 | 54 | 48 | 62 | 54 | 60 | 54 | 59 | 54 | 63 | 58 | 59 | 54 |
| 1A | 55 | 46 | 62 | 55 | 55 | 50 | 61 | 54 | 59 | 54 | 59 | 53 | 63 | 58 | 59 | 53 |
| 2 | 52 | 52 | 58 | 55 | 50 | 52 | 55 | 53 | 52 | 54 | 51 | 54 | 57 | 57 | 53 | 55 |
| 3 | 49 | 52 | 58 | 63 | 44 | 55 | 57 | 62 | 51 | 63 | 51 | 62 | 55 | 65 | 46 | 57 |
| 4 | 48 | 49 | 60 | 58 | 49 | 53 | 59 | 55 | 55 | 61 | 55 | 60 | 60 | 62 | 55 | 58 |
| 5 | 51 | 49 | 57 | 56 | 52 | 52 | 59 | 57 | 52 | 53 | 52 | 52 | 56 | 56 | 53 | 53 |
| 5B | 58 | 55 | 59 | 56 | 58 | 55 | 59 | 57 | 58 | 58 | 58 | 57 | 62 | 55 | 57 | 57 |
| 6 | 54 | 47 | 60 | 51 | 54 | 47 | 61 | 50 | 58 | 52 | 55 | 51 | 60 | 53 | 57 | 51 |
| 7 | 48 | 53 | 57 | 58 | 47 | 53 | 55 | 56 | 53 | 56 | 52 | 55 | 56 | 57 | 52 | 53 |
| 8 | 51 | 59 | 59 | 53 | 49 | 51 | 58 | 55 | 52 | 54 | 50 | 52 | 56 | 55 | 56 | 53 |
| 9 | 50 | 46 | 59 | 52 | 51 | 48 | 58 | 53 | 56 | 52 | 55 | 51 | 59 | 53 | 55 | 50 |
| 9A | 57 | 50 | 58 | 51 | 56 | 50 | 59 | 57 | 61 | 56 | 62 | 56 | 62 | 56 | 60 | 55 |
| 10 | 51 | 56 | 56 | 61 | 47 | 56 | 51 | 56 | 48 | 57 | 48 | 57 | 54 | 61 | 49 | 58 |
| 11 | 52 | 49 | 61 | 56 | 54 | 52 | 61 | 57 | 58 | 56 | 58 | 55 | 63 | 59 | 59 | 56 |

*T indicates temperature 5 inches from top of food space.

*B indicates temperature 1½ inches from bottom of food space.

Table IX - Temperatures in Cabinets

Ambient Temperature 70° F., Load "C" (Temperatures Are in Deg. F.)

Door opening 8-9 a.m., 11-12 a.m., 3-4 p.m.: 13 openings per hour, plus equivalent food load of 50 B.t.u. per hour (25 B.t.u. in Nos. 5B and 9A), and 4 lbs. water at 12:10 p.m. (2 lbs. in Nos. 5B and 9A).

| Refrigerator No. | 8 a.m. | | 9 a.m. | | 11 a.m. | | 12 m. | | 2 p.m. | | 3 p.m. | | 4 p.m. | | 6 p.m. | | 8 p.m. | |
|------------------|--------|----|--------|----|---------|----|-------|----|--------|----|--------|----|--------|----|--------|----|--------|----|
| | T° | B° | T° | B° | T° | B° | T° | B° | T° | B° | T° | B° | T° | B° | T° | B° | T° | B° |
| 1 | 52 | 51 | 53 | 51 | 55 | 51 | 55 | 52 | 53 | 52 | 55 | 52 | 54 | 52 | 53 | 52 | 53 | 52 |
| 1A | 51 | 48 | 53 | 50 | 51 | 50 | 52 | 51 | 50 | 51 | 50 | 50 | 52 | 52 | 51 | 52 | 56 | 51 |
| 2 | 49 | 52 | 50 | 52 | 49 | 52 | 51 | 52 | 49 | 52 | 50 | 53 | 52 | 54 | 50 | 53 | 50 | 52 |
| 3 | 44 | 49 | 45 | 53 | 42 | 50 | 45 | 53 | 45 | 53 | 43 | 52 | 46 | 55 | 42 | 51 | 40 | 49 |
| 4 | 46 | 51 | 46 | 51 | 46 | 52 | 50 | 53 | 45 | 50 | 46 | 50 | 49 | 50 | 47 | 51 | 47 | 52 |
| 5 | 49 | 48 | 50 | 50 | 50 | 50 | 51 | 50 | 50 | 49 | 50 | 49 | 51 | 51 | 50 | 49 | 49 | 49 |
| 5B | 59 | 55 | 58 | 55 | 58 | 55 | 59 | 56 | 52 | 59 | 57 | 58 | 57 | 55 | 57 | 53 | 57 | 53 |
| 6 | 51 | 47 | 52 | 48 | 51 | 48 | 53 | 49 | 51 | 47 | 50 | 47 | 52 | 49 | 51 | 48 | 50 | 47 |
| 7 | 48 | 50 | 49 | 51 | 47 | 50 | 49 | 52 | 47 | 51 | 48 | 52 | 51 | 53 | 47 | 51 | 46 | 50 |
| 8 | 46 | 47 | 48 | 48 | 46 | 48 | 49 | 49 | 46 | 48 | 46 | 48 | 46 | 49 | 46 | 48 | 44 | 47 |
| 9 | 46 | 44 | 48 | 45 | 48 | 46 | 50 | 47 | 48 | 47 | 48 | 47 | 49 | 47 | 50 | 46 | 47 | 45 |
| 9A | 55 | 50 | 56 | 51 | 55 | 50 | 57 | 52 | 58 | 53 | 57 | 52 | 58 | 53 | 57 | 62 | 57 | 52 |
| 10 | 44 | 51 | 45 | 53 | 44 | 53 | 46 | 54 | 46 | 54 | 46 | 54 | 47 | 55 | 46 | 55 | 45 | 53 |
| 11 | 49 | 51 | 51 | 52 | 50 | 52 | 53 | 53 | 46 | 51 | 50 | 51 | 52 | 52 | 50 | 50 | 48 | 49 |

*T indicates temperature 5 inches from top of food space.

*B indicates temperature 1½ inches from bottom of food space.

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½ H.P., 115-230 V. D.C.

Here are the Facts..

Sales Figures

Revision of State Sales for 1935 Shows Lower Total for Illinois

Editor's Note: It has been called to our attention that the tabulation of sales by states by Nema members as published in the Feb. 5 issue of Electric Refrigeration News was incorrect; a check on the

reports showed that one concern has been reporting all of its sales in Illinois, thereby causing a revision of the sales-by-states figures as published below:

| States and Territories | Quantity of Household Low Sides | Value |
|---|---------------------------------|-----------|
| Alabama | 22,320 | 1,834 |
| Arizona | 5,373 | 5,284 |
| Arkansas | 9,420 | 64,013 |
| California | 114,923 | 3,129 |
| Colorado | 11,416 | 178,659 |
| Connecticut | 22,536 | 24,306 |
| Delaware | 3,150 | 3,825 |
| District of Columbia | 11,262 | 90,331 |
| Florida | 26,007 | 16,279 |
| Georgia | 27,034 | 14,090 |
| Idaho | 6,676 | 117,982 |
| Illinois | 107,672 | 7,459 |
| Indiana | 36,844 | 12,385 |
| Iowa | 23,217 | 4,878 |
| Kansas | 18,343 | 23,804 |
| Kentucky | 16,958 | 60,350 |
| Louisiana | 14,260 | 6,932 |
| Maine | 7,247 | 3,233 |
| Maryland | 20,794 | 21,478 |
| Massachusetts | 60,943 | 21,217 |
| Michigan | 63,644 | 15,081 |
| Minnesota | 20,864 | 24,506 |
| Mississippi | 6,728 | 2,300 |
| Missouri | 43,944 | 1,446,790 |
| Montana | 5,983 | 15,994 |
| Nebraska | 15,877 | 107,599 |
| Nevada | | 1,570,383 |
| New Hampshire | | |
| New Jersey | | |
| New Mexico | | |
| New York | | |
| North Carolina | | |
| North Dakota | | |
| Ohio | | |
| Oklahoma | | |
| Oregon | | |
| Pennsylvania | | |
| Rhode Island | | |
| South Carolina | | |
| South Dakota | | |
| Tennessee | | |
| Texas | | |
| Utah | | |
| Vermont | | |
| Virginia | | |
| Washington | | |
| West Virginia | | |
| Wisconsin | | |
| Wyoming | | |
| Total United States | | 1,446,790 |
| Canada | | 15,994 |
| Other Foreign (Including U. S. Possessions) | | 107,599 |
| Total for World | | 1,570,383 |

Exports of Electric Refrigerators

December, 1935, Shipments Reported by the Bureau of Foreign and Domestic Commerce, Washington, D. C.

| | Electric Household Refrigerators | Value | Electric Commercial Refrigerators Up to 1 Ton | Value | Parts for Electric Refrigerators | Value |
|------------------------------------|----------------------------------|-----------|---|-----------|----------------------------------|-----------|
| Austria | 27 | \$ 2,547 | 6 | \$ 937 | | \$ 1,862 |
| Belgium | 27 | 2,547 | 60 | 5,223 | | 9,603 |
| Czechoslovakia | 26 | 1,396 | 4 | 1,131 | | 1,855 |
| Denmark | ... | ... | ... | ... | | 959 |
| Estonia | ... | ... | ... | ... | | 85 |
| Finland | 3 | 370 | 6 | 1,183 | | 1,197 |
| France | 283 | 20,333 | 47 | 3,531 | | 24,367 |
| Germany | 7 | 482 | ... | ... | | 1,687 |
| Gibraltar | ... | ... | 1 | 179 | | 18 |
| Greece | 1 | 52 | ... | ... | | 297 |
| Hungary | 1 | 47 | 10 | 478 | | 121 |
| Irish Free State | 1 | 35 | ... | ... | | 94 |
| Italy | 30 | 4,088 | ... | ... | | 2,490 |
| Netherlands | 84 | 6,708 | 29 | 4,117 | | 5,544 |
| Norway | 10 | 834 | 6 | 722 | | 971 |
| Poland and Danzig | 3 | 103 | ... | ... | | ... |
| Portugal | 5 | 436 | ... | ... | | 510 |
| Rumania | 12 | 1,010 | ... | ... | | 69 |
| U.S.S.R. (Russia, Europe and Asia) | 1 | 69 | ... | ... | | 93 |
| Spain | 25 | 3,010 | 5 | 1,079 | | 4,447 |
| Sweden | 8 | 305 | 3 | 408 | | 11,483 |
| Switzerland | 1 | 100 | ... | ... | | 4,582 |
| United Kingdom | 163 | 13,785 | 627 | 36,661 | | 38,239 |
| Yugoslavia | 1 | 195 | ... | ... | | ... |
| Canada | 15 | 1,721 | 3 | 385 | | 14,696 |
| British Honduras | ... | ... | ... | ... | | 387 |
| Costa Rica | 9 | 984 | ... | ... | | 105 |
| Guatemala | 1 | 90 | ... | ... | | 89 |
| Honduras | 13 | 1,548 | 1 | 775 | | 81 |
| Nicaragua | 1 | 68 | ... | ... | | 601 |
| Panama | 62 | 7,033 | 5 | 564 | | 1,777 |
| Salvador | 9 | 639 | ... | ... | | 92 |
| Mexico | 33 | 3,542 | 14 | 2,744 | | 6,208 |
| Newfoundland and Labrador | 1 | 119 | ... | ... | | ... |
| Bermuda | 3 | 447 | ... | ... | | 97 |
| Barbados | 1 | 105 | ... | ... | | 49 |
| Jamaica | 3 | 362 | 2 | 653 | | 387 |
| Trinidad and Tobago | 31 | 2,852 | ... | ... | | 886 |
| Other British West Indies | 8 | 724 | 3 | 2,971 | | 203 |
| Cuba | 129 | 12,304 | 14 | 3,269 | | 1,835 |
| Dominican Republic | 29 | 2,852 | 2 | 465 | | 8 |
| Netherland West Indies | 43 | 3,560 | 3 | 462 | | 811 |
| French West Indies | 17 | 1,433 | ... | ... | | 199 |
| Haiti, Republic of | 19 | 2,207 | 1 | 110 | | 247 |
| Argentina | 429 | 19,392 | 14 | 1,274 | | 21,802 |
| Bolivia | 1 | 75 | ... | ... | | 209 |
| Brazil | 885 | 65,964 | 94 | 10,046 | | 15,574 |
| Chile | 148 | 12,534 | 11 | 1,955 | | 1,619 |
| Colombia | 114 | 10,496 | 4 | 476 | | 461 |
| Ecuador | 2 | 307 | ... | ... | | 160 |
| British Guiana | 20 | 1,703 | ... | ... | | 13 |
| Surinam | 4 | 478 | ... | ... | | ... |
| Paraguay | 6 | 313 | ... | ... | | ... |
| Peru | 56 | 4,468 | ... | ... | | 1,101 |
| Uruguay | 29 | 4,229 | 1 | 289 | | 1,067 |
| Venezuela | 72 | 7,202 | ... | ... | | 1,036 |
| Saudi Arabia | ... | ... | ... | ... | | 4 |
| British India | 196 | 17,311 | 45 | 4,989 | | 7,864 |
| British Malaya | 158 | 12,851 | 5 | 619 | | 2,971 |
| Ceylon | 49 | 4,518 | ... | ... | | 389 |
| China | 10 | 1,235 | 15 | 991 | | 682 |
| Netherland India | 271 | 26,817 | 13 | 1,568 | | 2,988 |
| French Indo-China | 132 | 16,746 | 3 | 84 | | 1,954 |
| Hong Kong | 19 | 2,332 | 3 | 258 | | 352 |
| Iraq | ... | ... | ... | ... | | 105 |
| Japan | 2 | 130 | ... | ... | | 1,284 |
| Palestine | 32 | 2,561 | ... | ... | | 1,574 |
| Philippine Islands | 134 | 15,683 | 9 | 1,618 | | 4,226 |
| Siam | 10 | 1,222 | ... | ... | | 276 |
| Syria | 1 | 194 | ... | ... | | 40 |
| Turkey | 7 | 308 | 2 | 361 | | 123 |
| Other Asia | 2 | 488 | ... | ... | | 413 |
| Australia | 550 | 26,292 | 52 | 1,581 | | 17,536 |
| British Oceania | ... | ... | ... | ... | | 25 |
| French Oceania | 1 | 121 | ... | ... | | 25 |
| New Zealand | 309 | 27,085 | 6 | 450 | | 5,746 |
| Belgian Congo | 15 | 1,375 | ... | ... | | 355 |
| British E. Africa | 16 | 1,613 | ... | ... | | 2,393 |
| Union of South Africa | 1,255 | 116,201 | 35 | 3,065 | | 30,500 |
| Other British South Africa | ... | ... | ... | ... | | 124 |
| Gold Coast | 10 | 858 | ... | ... | | 227 |
| Nigeria | 26 | 2,829 | ... | ... | | 121 |
| Other British West Africa | 2 | 282 | ... | ... | | 187 |
| Egypt | 15 | 1,644 | 12 | 1,849 | | 1,648 |
| Algeria and Tunisia | 4 | 197 | 1 | 69 | | 1,522 |
| Madagascar | 9 | 635 | ... | ... | | 136 |
| Other French Africa | 92 | 8,443 | ... | ... | | 98 |
| Italian Africa | ... | ... | ... | ... | | 22 |
| Liberia | ... | ... | ... | ... | | 111 |
| Morocco | 1 | 38 | ... | ... | | 104 |
| Mozambique | 18 | 1,593 | ... | ... | | 1,783 |
| Other Portuguese Africa | 5 | 396 | ... | ... | | 22 |
| Canary Islands | 3 | 307 | 2 | 275 | | 66 |
| Other Spanish Africa | 3 | 290 | ... | ... | | 10 |
| Total | 6,241 | \$518,316 | 1,188 | \$100,729 | | \$271,996 |
| Shipments to Hawaii | 747 | 77,289 | 102 | 12,635 | | 5,676 |
| Puerto Rico | 187 | 19,578 | 10 | 1,142 | | 4,818 |
| Virgin Islands | 8 | 658 | ... | ... | | 66 |

Final Figures for 1935 Show Sales of 1,570,333 Household Electric Refrigerators By 14 Firms

The following 14 member companies of the Refrigeration Division of the National Electrical Manufacturers Association (Nema) reported household refrigerator sales for the entire year of 1935:

Apex Electrical Mfg. Co., Crosley Radio Corp., Frigidaire Corp., General Electric Co., Gibson Electric Refrigeration Co., Kelvinator Corp., Leonard Refrigerator Co., Norge Corp., Servel, Inc. (export only), Stewart-Warner Corp., Sunbeam Electric Mfg. Co., Uniflow Mfg. Co., Universal Cooler Corp., and Westinghouse Electric & Mfg. Co.

Member companies not reporting included: Jomoco, Inc., Merchant & Evans Co., and Sparks-Withington Co.

The sales of the reporting companies do, however, include units manufactured for the following concerns: Major Appliance Corp., Montgomery Ward & Co., Potter Refrigerator Corp., Sears, Roebuck & Co., and Truscon Steel Co.

| SALES FOR YEAR, 1935 | | | | | | | | | |
|--|-----------|---------------|----------|-------------|----------|---------------|-----------|---------------|--|
| Lacquer (Exterior) Cabinets Complete | | Domestic | | Canadian | | Other Foreign | | World | |
| | Quantity | Value | Quantity | Value | Quantity | Value | Quantity | Value | |
| 1. Chest | 22,939 | \$ 1,140,552 | 862 | \$ 40,875 | 6,820 | \$ 346,769 | 30,621 | \$ 1,528,196 | |
| 2. Less than 3 cu. ft. | 1,576 | 88,981 | ..... | ..... | 365 | 19,253 | 1,941 | 108,234 | |
| 3. 3 to 3.99 cu. ft. | 56,552 | 3,229,235 | 287 | 17,015 | 13,108 | 738,545 | 69,947 | 3,984,795 | |
| 4. 4 to 4.99 cu. ft. | 309,071 | 20,048,203 | 6,512 | 464,332 | 37,921 | 2,471,104 | 353,504 | 22,983,639 | |
| 5. 5 to 5.99 cu. ft. | 325,453 | 25,186,458 | 2,854 | 224,465 | 12,647 | 992,068 | 340,954 | 26,402,991 | |
| 6. 6 to 6.99 cu. ft. | 207,192 | 18,632,435 | 1,587 | 144,369 | 8,197 | 749,972 | 216,976 | 19,526,776 | |
| 7. 7 to 7.99 cu. ft. | 103,954 | 11,059,468 | 2,020 | 223,760 | 3,493 | 375,977 | 109,467 | 11,659,205 | |
| 8. 8 to 8.99 cu. ft. | 23,970 | 2,721,449 | 155 | 17,139 | 1,061 | 127,786 | 25,186 | 2,866,374 | |
| 9. 9 to 10.99 cu. ft. | 411 | 80,416 | 5 | 699 | 66 | 14,234 | 482 | 95,349 | |
| 10. 10 to 12.99 cu. ft. | 47 | 12,024 | 3 | 608 | 10 | 2,115 | 60 | 14,747 | |
| 11. Total Lacquer | 1,051,165 | \$2,199,221 | 14,285 | \$1,133,262 | 83,688 | \$5,837,823 | 1,149,138 | \$9,170,396 | |
| | | | | | | | | | |
| Porcelain (Exterior) Cabinets Complete | | Domestic | | Canadian | | Other Foreign | | World | |
| | Quantity | Value | Quantity | Value | Quantity | Value | Quantity | Value | |
| 12. Up to 4.99 cu. ft. | 14,253 | 1,093,503 | 452 | 43,011 | 1,160 | 91,029 | 15,865 | 1,227,543 | |
| 13. 5 to 5.99 cu. ft. | 51,196 | 4,529,345 | 227 | 20,697 | 3,144 | 286,689 | 54,567 | 4,836,731 | |
| 14. 6 to 6.99 cu. ft. | 61,320 | 6,400,009 | 91 | 10,466 | 1,853 | 195,574 | 63,264 | 6,606,049 | |
| 15. 7 to 7.99 cu. ft. | 48,964 | 5,916,932 | 178 | 24,016 | 2,248 | 278,847 | 51,390 | 6,219,795 | |
| 16. 8 to 8.99 cu. ft. | 21,487 | 3,077,703 | 109 | 14,412 | 1,174 | 172,907 | 22,770 | 3,265,022 | |
| 17. 9 to 12.99 cu. ft. | 5,914 | 1,059,913 | 26 | 5,337 | 621 | 111,064 | 6,561 | 1,176,319 | |
| 18. 13 cu. ft. and up. | 2,442 | 582,290 | 13 | 3,062 | 350 | 81,563 | 2,905 | 666,915 | |
| 19. Total Porcelain | 205,576 | \$2,659,700 | 1,096 | \$121,001 | 10,550 | \$1,217,673 | 217,222 | \$23,998,374 | |
| 20. Total Lines 11 and 19 | 1,256,741 | \$104,858,921 | 15,381 | \$1,254,263 | 94,238 | \$7,055,496 | 1,366,360 | \$113,168,680 | |
| 21. Separate Systems | | | | | | | | | |
| 1/4 Hp. or Less | 186,814 | 7,257,078 | 10 | 568 | 10,676 | 531,852 | 197,500 | 7,789,498 | |
| 22. Separate Household Evaporators | 3,235 | 61,925 | 603 | 9,223 | 2,685 | 49,371 | 6,523 | 120,519 | |
| 23. Total Lines 20, 21, 22 | 1,446,790 | ..... | 15,994 | ..... | 107,599 | ..... | 1,570,383 | ..... |  |
| 24. Condensing Units | | | | | | | | | |
| 1/4 Hp. or Less | 5,913 | 314,149 | 251 | 15,084 | 7,323 | 416,258 | 13,487 | 745,491 | |
| 25. Cabinets—No Systems | 6,171 | 211,341 | 11 | 544 | 3,260 | 101,619 | 9,442 | 313,504 | |
| 26. Total Household | ..... | \$112,703,414 | ..... | \$1,279,682 | ..... | \$8,154,596 | ..... | \$122,137,692 | |

116,533 Commercial Machines Sold during 1935, Final Reports of 19 Companies Show

Commercial unit sales for 1935 were reported to National Electrical Manufacturers Association by manufacturers who were both members and non-members of the association. These reports cover the sales of units less than 1 hp. in size. Companies reporting sales for the entire

year include: Baker Ice Machine Co., Brunner Mfg. Co., Carbondale Machine Corp., Carrier Engineering Corp., Crosley Radio Corp., Frigidaire Corp., General Electric Co., Gibson Electric Refrigerator Corp., Kelvinator Corp., Leonard Refrigerator Co., Norge Corp., Phoenix Ice

Machine Co., Servel, Inc., Uniflow Mfg. Co., Universal Cooler Corp., Westinghouse Electric & Mfg. Co., and York Ice Machinery Corp. Reliance Refrigerating Machine Co. reported its sales since May, and Merchant & Evans Co. reported its sales since September.

| SALES FOR YEAR, 1935 | | | | | | | | | |
|--|----------|--------------|----------|-----------|----------|---------------|----------|--------------|--|
| COMMERCIAL | Domestic | | Quantity | Canadian | | Other Foreign | | World | |
| | Quantity | Value | | Value | Quantity | Value | Quantity | Value | |
| 1. Water Coolers Complete... | 13,921 | 1,421,697 | 49 | \$ 5,212 | 935 | \$ 100,930 | 14,905 | \$ 1,527,839 | |
| 2. Water Coolers Remote... | 752 | 47,361 | 15 | 775 | 32 | 2,412 | 799 | 50,548 | |
| 3. Ice Cream Cabinets Complete | 10,659 | 1,306,027 | 661 | 72,652 | 1,058 | 132,482 | 12,378 | 1,511,161 | |
| 4. Ice Cream Cabinets Remote | 4,465 | 618,338 | 100 | 12,078 | 314 | 41,819 | 4,879 | 672,235 | |
| 5. Beverage Coolers Comp. | 20,333 | 1,514,048 | 88 | 5,835 | 335 | 24,809 | 20,756 | 1,544,692 | |
| 6. Beverage Coolers Remote | 2,127 | 160,616 | 1 | 59 | 124 | 7,624 | 2,252 | 168,299 | |
| Condensing Units | | | | | | | | | |
| 7. Less than 1/2 Hp. | 7,551 | 412,059 | 81 | 5,251 | 6,811 | 399,952 | 14,443 | 817,262 | |
| 8. 1/2 to 1/2 Hp. Inc. | 30,592 | 2,523,722 | 724 | 63,837 | 12,283 | 967,589 | 43,599 | 3,555,148 | |
| 9. Above 1/2 and Less Than 1 Hp. | 8,288 | 1,101,641 | 219 | 29,539 | 1,945 | 234,384 | 10,452 | 1,365,564 | |
| 10. Total Lines 7, 8, and 9 ... | 46,431 | ..... | 1,024 | ..... | 21,039 | ..... | 68,494 | ..... |  |
| 11. Total Lines 1, 3, 5, 10 ... | 91,344 | ..... | 1,822 | ..... | 23,367 | ..... | 116,533 | ..... |  |
| 12. Evaporators | 43,981 | 1,283,703 | 1,774 | 67,072 | 10,184 | 288,791 | 55,939 | 1,639,566 | |
| 13. Miscellaneous Cases and Cabinets | 343 | 79,063 | 65 | 6,934 | 69 | 18,474 | 477 | 104,411 | |
| 14. Total Commercial | | \$10,468,215 | | \$269,244 | | \$2,219,266 | | \$12,956,725 | |

Patents

Issued March 3, 1936

2,032,365. GRILLE. John Karmazin. Grosse Ile, Mich., assignor to Karmazin Engineering Co., a corporation of Michigan. Application Nov. 13, 1933. Serial No. 697,756. 9 Claims. (Cl. 189-82.)

2,032,404. AIR COOLING. WASHING. AND HUMIDIFYING APPARATUS. Ernest F. Fisher, Richmond Heights, Mo. Application June 3, 1935. Serial No. 24,694. 5 Claims. (Cl. 261-116.)

2,032,429. LOAD CONTROLLING APPARATUS FOR COMPRESSORS. Chester W. Metzgar, Easton, Pa., assignor to Ingersoll-Rand Co., Jersey City, N. J., a corporation of New Jersey. Application July 26, 1934. Serial No. 737,036. 15 Claims. (Cl. 230-21.)

2,032,433. TEMPERATURE REGULATING SYSTEM. Mendel Osnos, Berlin, Germany, assignor to Telefunken Gesellschaft fur Drahtlose Telegraphie m. b. H., Berlin, Germany, a corporation of Germany. Application Feb. 14, 1934. Serial No. 711,143. In Germany Feb. 7, 1933. 8 Claims. (Cl. 236-1.)

2,032,534. REFRIGERATING APPARATUS. Richard S. Gaugler, Dayton, Ohio, assignor to General Motors Corp., Dayton, Ohio, a corporation of Delaware. Application March 29, 1935. Serial No. 13,720. 6 Claims. (Cl. 62-108.5.)

2,032,563. BELLOWS ASSEMBLY. Walter B. Clifford, Boston, and John E. Woods, Newtonville, Mass., assignors to Clifford Manufacturing Co., Boston, Mass. Application Jan. 8, 1935. Serial No. 874. 3 Claims. (Cl. 297-3.)

2,032,572. AIR CONDITIONER FOR VEHICLES. James E. Hammers, Burt F. Hammers, and Ezra C. Buehler, Lawrence, Kans., assignors of 40% to Ellen S. Bates and Frank Bates, both of Topeka, Kans. Application Oct. 19, 1934. Serial No. 749,063. 12 Claims. (Cl. 62-117.)

2,032,634. HUMIDIFIER. Hugh G. Ross, Ottawa, Ontario, Canada. Application Aug. 19, 1933. Serial No. 685,935. In Canada May 3, 1933. 6 Claims. (Cl. 261-107.)

2,032,639. MOLD FOR FREEZING LIQUIDS OR SEMILIQUIDS. Richard M. Storer, Denver, Colo. Application April 26, 1932. Serial No. 607,539. 12 Claims. (Cl. 62-108.5.)

2,032,649. VACUUM INSULATED, MERCURY CONTROLLED, DRY ICE CON-

TAINER. Charles Willford Boger, Mount Vernon, Ill. Application Jan. 14, 1935. Serial No. 1,791. 2 Claims. (Cl. 62-91.5.)

2,032,722. BEER CONTAINER. Frank X. Schwab, Buffalo, N. Y. Application July 6, 1934. Serial No. 733,993. 3 Claims. (Cl. 225-16.)

2,032,853. FLOW CONTROL. Karl W. Rausch, East Cleveland, Ohio, assignor to Perfection Stove Co., Cleveland, Ohio, a corporation of Ohio. Application Aug. 12, 1933. Serial No. 684,869. 11 Claims. (Cl. 158-41.)

2,032,913. VENTILATING CONSTRUCTION FOR MECHANICAL REFRIGERATORS. Powel Crosley, Jr., Cincinnati, Ohio, assignor to The Crosley Radio Corp., Cincinnati, Ohio, a corporation of Ohio. Application March 20, 1934. Serial No. 716,489. 6 Claims. (Cl. 62-116.)

2,033,022. PORTABLE PRECOOLING EQUIPMENT. George Walter Baker, Jacksonville, Fla., assignor to American Coolair Corp., Jacksonville, Fla. Application March 28, 1935. Serial No. 13,554. 4 Claims. (Cl. 98-6.)

2,033,063. MEANS FOR CONTROLLING REFRIGERATING APPARATUS AND INTERCHANGING THE FUNCTIONS OF COMPLEMENTARY HEAT EXCHANGE ELEMENTS THEREOF. William V. Duke, Philadelphia, Pa., assignor to Baldwin-Southwark Corp., a corporation of Delaware. Application May 31, 1933. Serial No. 673,758. 11 Claims. (Cl. 62-4.)

2,033,069. COMBINED HEATING AND COOLING APPARATUS. Harold F. Hagen, Dedham, and Samuel M. Anderson, Sharon, Mass., assignors to B. F. Sturtevant Co., Inc., Boston, Mass. Application July 5, 1934. Serial No. 733,734. 2 Claims. (Cl. 98-10.)

DESIGN

98,751. DESIGN FOR A TOP FOR A DISPENSING REFRIGERATOR. Robert E. Baker, Muncie, Ind., assignor to Glascock Brothers Mfg. Co., Muncie, Ind., a corporation of Indiana. Application Nov. 15, 1935. Serial No. 59,596. Term of patent 14 years.

PATENTS

HAVE YOUR patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. Van Deventer (ASRE), Patent Attorney, 342 Madison Avenue, New York City.

G-E Brings Out Line of Transformer Speed Regulators

SCHENECTADY—A new line of manually operated transformer speed regulators for high-phase and low-torque capacitor motors, with and without full-voltage starting for single-phase and polyphase fan motors, has been introduced by General Electric Co.

The units consist of a tapped autotransformer and a snap switch, and a relay which provides full-voltage starting by affording automatic transfer to the desired running position. With special additions, the regulators are available for reversing service as well as for operation from external sources, such as thermostats in an air-conditioning system.

The snap switch provides for three speed positions. Four other low speeds may be obtained through reconnection of the transformer taps to the snap switch. Regulators are for single-phase motors, rated up to 2 hp., and for polyphase motors rated up to 5 hp. The polyphase regulator combines two autotransformers connected in open delta, with a rotating snap switch mounted on a sleeve between the transformer cores. For reversing service, an additional snap switch is mounted adjacent to the line switch.

Deppman to Distribute Penn Controls in Detroit

DETROIT—R. L. Deppmann Co. here, was recently appointed distributor of Penn controls for heating service, reports R. H. Luscombe, manager of the distributor division of Penn Electric Switch Co., Des Moines.

The new distributor will handle the complete line of controls for oil, gas, and stoker heating, serving the automatic heating trade in the Detroit area.

W. C. Du Comb Co., 6335 Palmer Ave. here, will continue as distributor of Penn controls for refrigeration and air-conditioning service, and the company will maintain direct representation in Detroit through its office at 600 Michigan Theater building, which is under the direction of Paul Penn.

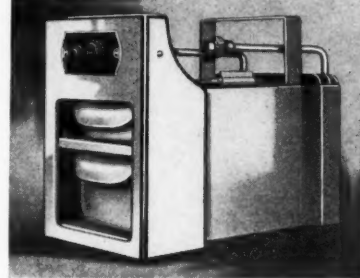
Virginia Smelting Names 2 New Distributors

BOSTON—Virginia Smelting Co., recently appointed two new distributors for its refrigerants: California Refrigerator Co., 1077 Mission St., San Francisco as distributor in northern California, and W. L. Coutts, Inc., Salt Lake City, as distributor of both sulphur dioxide and methyl chloride in Utah.

The Buyer's Guide

Suppliers Specializing in Service to the Refrigeration and Air Conditioning Industries

The NEW "HUMIDIPACK" EVAPORATOR by PEERLESS



A "1936" line of Household Evaporators with "1936" sales points.

1. High Box Humidity
2. Fast Ice Cube Freezing
3. Clean design—Smooth exterior
4. Reasonable prices
5. "Humidi-pack" is the Power-Pack of Refrigeration

PEERLESS ICE MACHINE CO.
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Representatives in all principal cities.

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FOR AIR CONDITIONING UNITS

Built to last, to give efficient, trouble-free service for years, to do your every heating or cooling job perfectly.

Also any type of extended surface coils made with Aluminum, Copper and Steel Fins on Copper and Steel Tubing . . . Expansion Valves . . . Pipe Bends and coils.

New Catalogue now in production . . . watch for it.

REMPE "FIN COIL" COMPANY

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STEELCRAFT REFRIGERATOR CABINETS

WE MANUFACTURE DISTINCTIVE FOUR AND SIX CU. FT. MODELS

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THE IDEAL REFRIGERATOR

FOR SMALL RESTAURANTS, LUNCH ROOMS, BARBECUE STANDS, ETC.



A practical all-metal Cabinet, white Du Lux, or porcelain finish—3" insulation—perfectly designed coil bunker—retained steel shelving—bright chromium hardware.

Originally a solid 4-door cabinet, the two top doors may be transferred to display type if desired, giving a shelf area of 9 sq. ft. Lower compartment, likewise equipped with shelves, has an area of more than 19 sq. ft.

The model 350 Cabinet has more storage space for its size—60" x 48" x 28"—than any other cabinet—and the price will surprise you.

Sold only through Dealers and Distributors

Write for complete catalog

GLOEKLER MANUFACTURING COMPANY

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Koch Believes In CORKBOARD

The insulation of every Koch fixture is installed thickly and thoroughly. Display cases, for example, have 4-in. thick corkboard insulation. The result is lower operating costs and diminished machine capacity required for refrigeration.

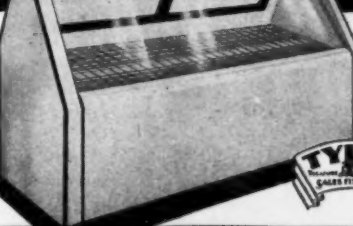
KOCH ESTABLISHED 1883

DISTRIBUTORS WANTED

Write for catalog and sales proposition. Submit references. Some attractive territories still open.

KOCH
North Kansas City, Mo.

TYLER'S NEW WELDED STEEL REFRIGERATOR CASES



At last a general purpose case at a sensible price. Offers every advantage of the most costly cases at tremendous savings. Modern in every detail. Comes equipped with coils. Single and double duty models.

AN AMAZING VALUE

Hundreds in use. Perfect refrigeration for meat, dairy and delicatessen products and all perishables sold in food stores. Write or wire for all the facts.

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3 INCH INSULATION-TRIPLE GLASS

Service Methods

Grover Townsend Licks a Knotty Water Valve Problem and 'Gums Up' An Ammonia Leak

Grover A. Townsend
Refrigeration Technician
175 River Street
Salamanca, N. Y.
All Makes of Electric Refrigerators
Installed—Serviced—Repaired
March 1, 1936

Publisher:

If this month keeps up the pace set by the last three weeks, I should be rather busy. When some of the units came out from their hibernation, they were sick with frozen controls and snow six inches thick on evaporators that owners had not defrosted for over a month.

February is usually a month of home talent plays in this town. A former schoolmate and I are usually called upon to provide the lighting. We averaged a play a week. They started off with a religious drama and ended up with a comedy—from the sublime to the ridiculous. With the exception of a 500 watt spot light on which we have installed a color wheel, the rest of the equipment is homemade. The high school stage doesn't even boast a good set of overhead lights.

Our rheostat consists of a five-

gallon crock of salt water into which we turn a vise screw. You ought to have seen the one act comedy (or tragedy) we gave from the top of a sixteen foot stepladder before one of the shows. Lucky the curtain ropes didn't break again during the show. They do occasionally.

Now that Lent is here, evenings and Sundays are my own again until after Easter when the Senior Class stage their annual three-act play to raise money for their year book. In the meantime I will try to keep the ball rolling with a few more stories. I hope the other fellows will soon catch the spirit.

Patience Is Rewarded

One morning I replaced a thermo valve in one of the walk-in coolers of a local meat market. There were two coolers on a 2-hp. water-cooled Lipman unit. The smaller of the two faced the market proper and had glass display doors.

The previous day I had determined by placing hot towels around the thermo valve that water had seeped into the valve case and frozen, damag-

ing the bellows. A later checkup of the valve according to the method outlined by D. D. Wile of Detroit Lubricator in one of his articles in the News proved my diagnosis correct. I had a new valve sent down from Buffalo.

After installing my gauge set, I shut off the liquid line at the receiver and pumped the low side down to zero. A shut off valve conveniently placed near the defective thermo valve kept the air from entering the liquid line. A slight pressure in the evaporator coils kept air out until the new valve was installed. This was one job I almost cried over. There was acrolein in the system.

When the litharge and glycerin had hardened, I built up a pressure in the low side and tested for leaks; found none; placed the system back in operation; watched it thru a cycle; and reset controls back to normal as the cut-out pressure had been lowered to take care of the defective valve before it had finally quit altogether. The high side pressure was rather high and the condensing water warm. As it was a hot day and the larger cooler had gone up to 50°, I let it ride while I went on to another job.

About closing time I dropped in and found the outlet water hot—168° to be exact. I made an appointment for that evening. On my return I tried turning the cylinder screw on the water valve all the way out. This should have increased the flow of water but it didn't. I screwed it in and out a couple of times. It still didn't work.

I removed the water valve gasket and strainer, cleaned and replaced them. Now I was in a fix. The valve refused to let even a drop of water flow. The next couple of hours were spent taking the valve apart, reassembling it and blowing the compressor oil out of the line leading to the bellows. Still it didn't work.

In desperation I laid down on my back and gazed up into the valve with the aid of a flashlight. Between drops I studied the view; tried pushing up on the rod which transmits the movement of the bellows to the disk. It moved freely. Still the rod lacked about an eighth of an inch of being level with the valve seat. By this time I had become slightly damp about the ears so I moved out from under.

Something that would shorten the distance between the rod and the brass screw which held the water gasket onto the disk would enable the rod to unseat the disk. I finally found a small fibre washer which fit nicely under the head of the screw. This raised the screw head about a sixteenth of an inch more above the gasket. On being reassembled the water rushed thru the valve full speed ahead.

I turned up the cylinder screw increasing the tension on the bellows until the water stopped flowing. Switching on the motor, the valve worked as the pressure built up. I adjusted the flow for an outlet temperature of 80° and it has worked like a top ever since.

I had a companion on this job who seemed to take an interest in what I was doing. When he wasn't on top of me, he watched me from his perch on the compressor head. I was told that the kitten sleeps there every night. Good thing the belts and pulleys were guarded or he might wake up some morning and find one of his nine lives missing.

A few call-backs were necessary in the next couple of days to adjust the thermo valves so as to equalize the temperature in the two coolers. My total time was six hours for which I received six dollars. This was one of my first jobs and has been a fine advertisement. This market is the oldest and largest in town. Other markets phone it when they need a service man. I am recommended with the result that I usually get the job.

A Gummy Trick

The first of last month one of the local Larkin Stores moved to a better location. The company's men placed new finned coils in the display cases. A couple of days later I received a call that there was an ammonia leak in one of the cases.

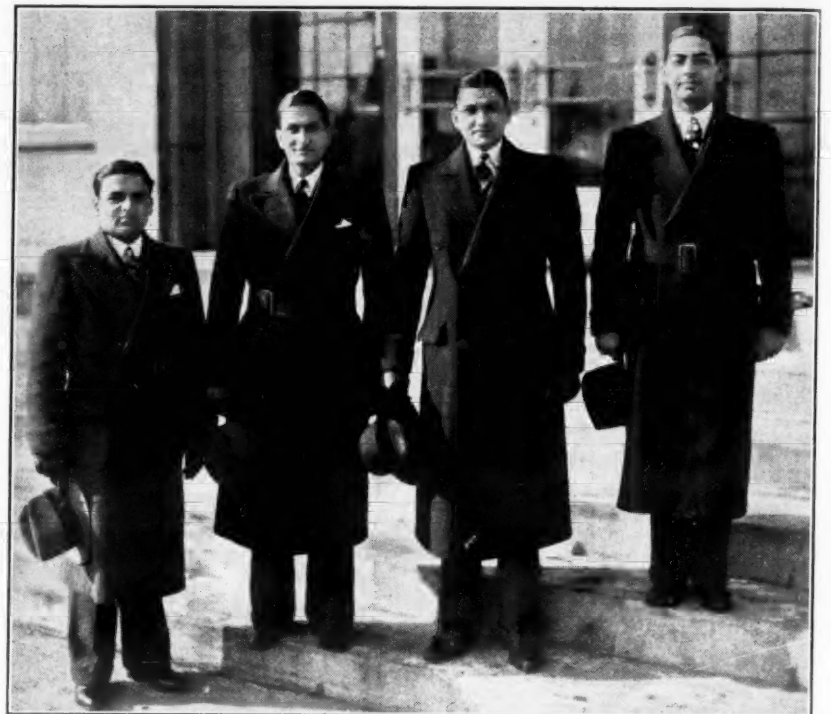
I arrived on the job with a service drum of sulphur dioxide that I had pumped out of an overcharged system. I attached a short length of purging hose to the drum. Cracking the valve slightly I killed most of the escaped ammonia gas. I fanned the white cloud away and began exploring with the end of the hose.

After fanning the smoke away a couple of times I could see the ammonia escaping from a tiny pin hole in one of the return bends of the finned coil. The manufacturer had failed to make a perfect weld.

I went over to the candy counter and helped myself to a package of Spearmint gum—with the clerk's permission of course. (Next time I am going to try Blackjack as the Spearmint flavor and ammonia gas didn't taste so well together.)

While chewing on a couple of sticks I went down cellar and shut off the valves on each side of the expansion

From Bombay to Study Service



These four brothers from India recently arrived in Dayton to attend the Frigidaire service school. They are, left to right: Ebrahim Dostmahomed Chinoy, Akbar Nurmahomed Chinoy, Fazal Rahintoola Chinoy, and Fazal Dostmahomed Chinoy, all graduates of the University of Bombay. Upon their return to India, they will be associated with their father in F. M. Chinoy & Co., Ltd., General Motors distributor in Bombay.

valve. The machine which had been running cut out at 10 pounds. I went back upstairs and placed the gum over the hole and taped it.

As it was impossible to tape very tight in such close quarters, I went across the street to a hardware store and bought a ground clamp. As the pressure rose in the coil it began to leak slightly. The moisture kept the gum from sticking.

I went back downstairs and pumped the machine back with the aid of the manual start until the gauge stayed at zero. I was careful not to go below zero. On returning I started up my Justrite torch, removed the poor patch and warmed up the coil at the leak. The gum stuck nicely to the warm dry surface. I taped it and replaced the ground clamp.

It held on placing the system back in operation and holds until this day. It was to have been only a temporary repair until the company's men could replace the coil with a perfect one. The next week one of the company's men dropped in and showed an interest in the job as the trick was a new one to him. As yet the coil has not been replaced. The roads are still bad between here and Buffalo.

My brother wants to use my typewriter so this letter must end. More stories in the next issue.

Sincerely yours,
GROVER A. TOWNSEND

P. S. You and Mr. Newcum are to be complimented on the MASTER SERVICE MANUAL. It's great!

Connecticut Floods Make Service Work

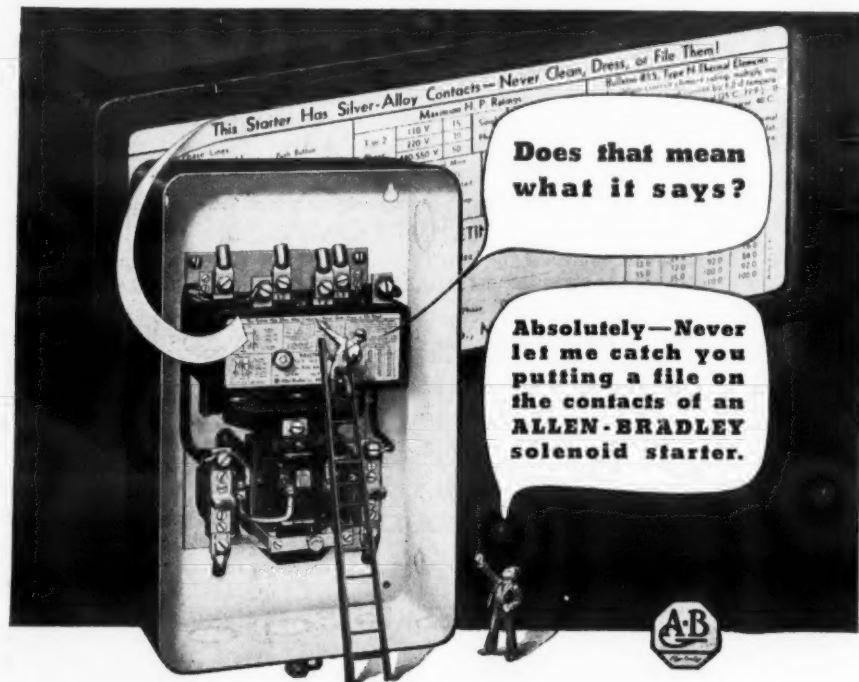
ANSONIA, Conn.—River floods have created plenty of work for refrigeration service men in this district. The Naugatuck river overflowed its banks here recently, causing heavy damage to mechanical refrigeration units in store basements throughout this section of the valley.

The \$4,000 unit in the basement of the First National chain grocery store was submerged, as was the cooling unit of the Fulton Market. Refrigeration units in the Excellent Shop, Vonetes' Palace of Sweets, and Sam's restaurant were also flooded.

Losses amounting to approximately \$800 were reported by the Androphy Electric Co., appliance dealer, but a carload of refrigerators and home laundry equipment which had been shipped to this company was still in the railroad yard and escaped damage.

Air-conditioning equipment in the Capital Theater was removed to a safe place before 10 feet of water filled the cellar.

Damage to refrigeration units was reported by business houses in the adjoining towns of Seymour and Derby, sections of which were inundated by the river which is said to have risen 17 ft. above its normal depth.

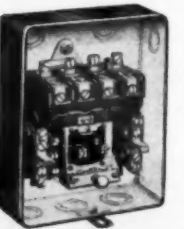


No More Contact Maintenance

BULLETIN 709 Solenoid Starters on your refrigerating and air conditioning motors



Bulletin 709SP solenoid starter for single-phase motors. Available in capacities up to and including 3 hp, 110 v; and 5 hp, 220 v.



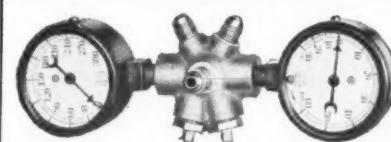
Bulletin 709 solenoid starter for polyphase motors. In ratings up to and including 30 hp, 220 v; and 50 hp, 440-550 volts.

The double-break silver-alloy contacts on the Bulletin 709 solenoid starter never require filing or dressing. Furthermore, as their useful life is not filed away, contacts last several times as long as ordinary copper-to-copper contacts. Then too, contact rebound, the main cause of contact welding and burning, has been almost entirely eliminated. The low drop-out voltage of the Bulletin 709 prevents the starter from opening unnecessarily when line voltage regulation is poor. All wiring is accessible from the starter front, and wiring space is generous.

Allen-Bradley offers a complete line of maintenance-free motor control for refrigerating and air conditioning motors in seven types of enclosing cabinets. Write for descriptive bulletins and price forms.

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WILMINGTON, DELAWARE



What's in the MASTER SERVICE MANUAL

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Theory of Refrigeration

A simple description of what refrigeration is, and how it is accomplished, with definitions of the terms involved.

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'Orphan' Makes

Information on how to service 13 makes of electric refrigerators which are no longer being manufactured will be found in the latter half of the book, after conclusion of Chapter 9.

The data on these "orphan" makes were taken from service manuals prepared by the manufacturers. The information covers the construction and operation of these machines, and offers service remedies for specific complaints.

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Questions

Refrigeration Schools

No. 2719 (Dealer, South Australia)—"Would you please put me in touch with the best coaches for refrigeration in the states?"

"I want a complete course starting from zero to the standard required by the American Society of Refrigeration Engineers. The course required will be postal of course. Could you get the Society of Refrigeration Engineers to write me giving full particulars of their requirements?"

"I have recently read several of your publications and congratulate you on the fine articles produced."

Answer: See advertisements of refrigeration schools in this issue.

Main office of the American Society of Refrigerating Engineers is at 37 W. 39th St., New York, N. Y. We have advised the Society to send you information regarding their "Data Book" and membership qualifications.

In addition to reading ELECTRIC REFRIGERATION NEWS each week, we would suggest that you obtain the new MASTER SERVICE MANUAL which is now just off the press. The MANUAL tells what to do and shows how to do it for all the fundamental types of refrigeration units.

Capacitors for Motors

No. 2720 (Supply Jobber, Minnesota)—"We are interested in getting in contact with manufacturers of 'Capacitors' for refrigeration motors to be used for replacement."

"We have your directory on refrigeration and air conditioning but note that there are no such manufacturers listed."

Answer: We would suggest that you write some of the manufacturers of motors listed in the REFRIGERATION AND AIR CONDITIONING DIRECTORY for information on how capacitors for replacement purposes can be obtained.

Capillary Tubes

No. 2721 (Dealer, California)—"Would you kindly advise us who manufactures capillary tubes? We have looked through your 1935 directory and cannot find any mention of it."

"We understand that the Rice Refrigerator Co. sold out their patents on this tube to some eastern company, who are prepared to furnish them in all sizes."

"Any light you can throw on this will be appreciated."

Answer: The capillary tube was developed several years ago by the company which manufactured Rice refrigerators, which are no longer being made. The Crosley Radio Corp., Cincinnati, Ohio, has used it. Servel used it in its hermetic unit.

For further information on capillary tubes write Isaac Rice, Jr., 295 Fifth Ave., New York City.

Refrigeration Week

No. 2722 (Newspaper, Illinois)—"We have been informed by one of the local refrigerator dealers that as a general rule National Refrigerator Week is scheduled each year during the early spring."

"As we contemplate publishing a special refrigerator section we would like to know if such a special week is being planned this year."

Answer: There has been no "National Refrigeration Week" in which the whole industry participates for the past several years. Most of the larger companies set aside a special "spring showing" week in which they offer special inducements for the customers to come and see the new line, and oftentimes local refrigeration bureaus or associations will sponsor shows in the Spring.

Small Refrigerator

C. A. Richards, Inc.
304 East 45th St.
New York, N. Y.

Editor:

As a subscriber to your paper, we are writing to ask you if you know of anyone in this country, aside from the Freezer Electric Refrigeration Co., division of Tennessee Furniture Corp., who makes an electric refrigerator with a capacity of approximately 2 cu. ft.

C. A. RICHARDS
President

Service Firm in Havana

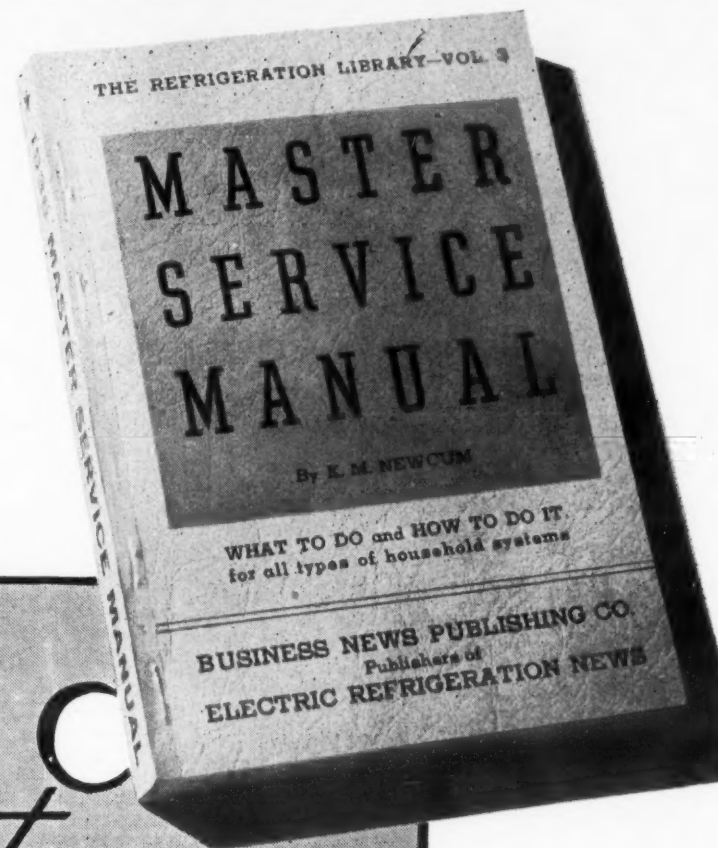
Interstate Refrigerator Corp.
96 Fifth Ave.
New York City

Editor:

Will you kindly send us a list of refrigeration service companies, also names of refrigeration engineers in Havana, Cuba.

This information is for a client of ours in Havana.

SAM BELASCO



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Here it is—the master key to household refrigerator servicing problems.

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The Refrigeration Engineer's Manual

By S. L. Potts

Methods of Figuring Capacity Of Any Condenser

Chapter 6—Condensers (Continued)

Horizontal Shell and Tube Type

Shell and tube condensers, horizontal construction. Shell type condensers are often used in the form of horizontal shells very much like horizontal steam condensers or horizontal return tubular boilers. Water headers are placed over each tube sheet and carry partitions dividing the tube spacing into different sections causing the water to circulate a number of times through the tubes. Some manufacturers classify this type as multitubular condensers with three, five, or seven passes.

Shell type condenser capacity. The vertical type allows 12 sq. ft. to 15 sq. ft. per ton of refrigeration which calls for the absorption of 16.6 to 13.3 B.t.u. per sq. ft. of cooling surface per minute for one ton of refrigeration respectively.

Fig. 54 shows a horizontal shell and tube condenser of the multipass type. The diameter of the shell ranges from 24 in. up to 50 in., and the length from 12 ft. to 20 ft. Some condensers of this type have 10 passes, or the water travels through the tubes 10 times from end to end. The conical heads have baffles arranged to control the flow of water. The gases enter at the gas inlet and the liquid is taken out at the liquid outlet. The cold water enters at the water inlet and leaves at the water outlet. The tube sheets are welded to the shell and the tubes are expanded into the tube sheets. The conical heads are removed to clean the tubes.

Fig. 55 shows another design of horizontal shell and tube condenser of the multipass type. The shell is made of 8-in. pipe welded into forged steel heads or tube sheets. Each condenser has seven passes for the water through one 2-in. tube. The gas enters at A and flows through the 8-in. tube B, C, D, E. The liquid is drained from F. The cold water enters at G flows seven times through a condenser and is discharged through header H.

Condensing Capacity

Condensing Capacity of Any Condenser. The function of the condenser is to remove the superheat of the gases, all the latent heat in the gases, and usually some of the sensible heat of the liquid. This may be expressed by the formula:

$$B.t.u. = (H_g - H_l)$$

This is also shown as:

B.t.u. = superheat of gas + latent heat of condensation + sensible heat removed from the liquid

$$B.t.u. = C_p(t_g - t_c) + L + C_l(t_c - t_l)$$

The heat contents of the superheated gas can be found from a table of the properties of superheated ammonia provided the temperature of the gases leaving the compressor is known.

The heat contents of the liquid leaving the condenser can be found from a table of the properties of saturated ammonia provided the con-

denser pressure is known (head pressure). If the liquid leaves the condenser at a lower temperature than due to the pressure, the heat contents of the liquid can be found from the saturated tables by looking up the heat contents for the temperature of the liquid instead of the pressure.

The temperature of the superheated gases coming from the compressor may be calculated from the following formula:

$$T_h = T_s \left[\frac{P_h}{P_s} \right]^{.231} \quad \text{See Form 66B}$$

Assume the following problem to illustrate the use of these formulas.

Problem: The head pressure on the system is 181 lbs. gauge. The suction pressure is 15 lbs. gauge pressure. The suction gases are assumed to be dry and saturated as coming from the evaporator.

1. What is the temperature of the gases leaving the compressor?

2. How many B.t.u. per lb. must be absorbed by the condensing water to condense the gases at 95° F.?

3. How many pounds of water per pound of NH₃ condensed with water entering at 70° and leaving at 95° F.?

4. How many gallons of water per minute per ton of refrigeration?

The temperature of the superheated gases is:

$$T_h = T_s \left[\frac{P_h}{P_s} \right]^{.231} = 460 \left[\frac{195.8}{30.42} \right]^{.231} = 460(6.436)^{.231}$$

The logarithm of 6.436 is .8086 and this multiplied by .231, the exponent of the fraction, gives .18678 which is the logarithm of 1.537

$T_h = 460 \times 1.537 = 708.02$ temperature absolute of gas.

$708.02 - 460 = 248.02^\circ \text{ F.}$ temperature of gases.

This represents 153 degrees of superheat in the gases. By looking up this temperature in a superheat ammonia table, we can find that the heat contents per pound of NH₃ is 735 B.t.u. and B.t.u. in liquid at 195.8 absolute is 149.4 B.t.u. Then the heat removed by the condenser is:

$$B.t.u. \text{ per lb.} = H_g - h_l = 735 - 149.4 = 585.6 \text{ B.t.u. per lb.}$$

The number of pounds of condensing water required to remove this amount of heat from one pound of NH₃ using water at 75 to 95 exit is:

$$W = \frac{H_g - h_l}{t_2 - t_1} = \frac{735 - 149.4}{95 - 70} = \frac{585.6}{25}$$

23.3 lbs. water per lb. NH₃, the number of pounds of condensing water per minute required to remove the heat from the NH₃ required for one ton of refrigeration.

The number of pounds of NH₃ required for ton is:

$$NH_3 = \frac{200 \text{ B.t.u.}}{H_g - h_l} = \frac{200}{611.8 - 149.4} = \frac{200}{462.4} = .433 \text{ lbs. NH}_3 \text{ per minute}$$

$$W = .433 \left[\frac{H_g - h_l}{t_2 - t_1} \right] = .433 \times 23.3 = 10.1 \text{ lbs. water per minute}$$

Another Type of Shell and Tube Condenser

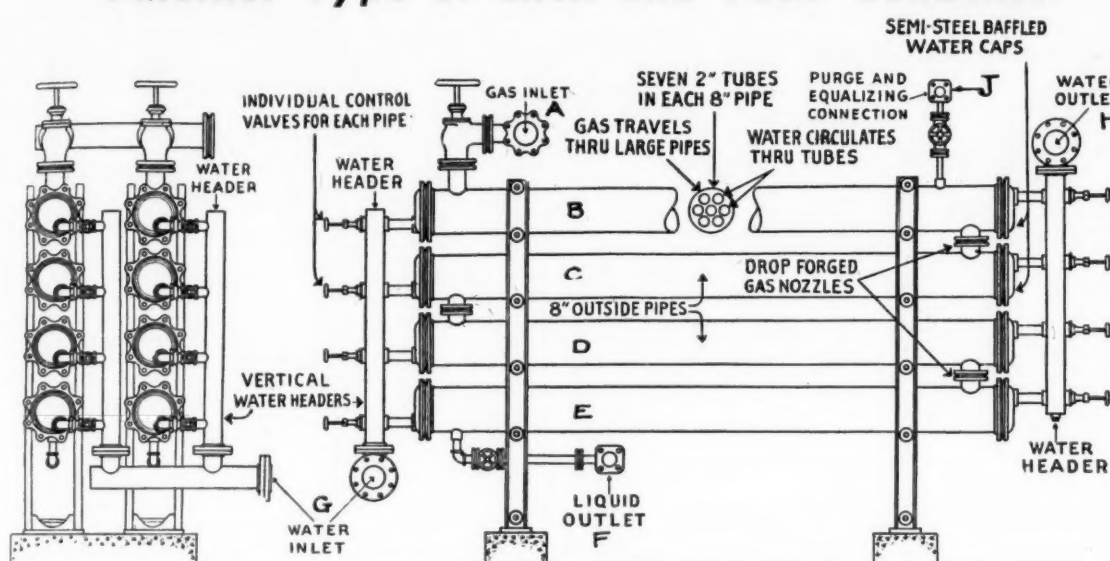


Fig. 55—Horizontal shell and tube condenser of the multipass type. The shell is of 8-inch pipe welded into forged steel heads or tube sheets. The figure at the right is an enlarged view of a head, showing baffles for control of water flow.

Table 8—Capacity of Ammonia Condenser

(Condenser Pressure at 181 Gauge, Condensing Water at 70° F.)

| Types of Condensers | Cooling Surface Per Ton Refrig. Sq. Ft. | B.t.u. Absorbed Per Sq. Ft. Per Min. | Most Common In Use In. | Lineal Ft. of Pipe Per Ton Refrig. | Water Gal. Per Min. Per Ton Refrig. |
|-------------------------|---|--------------------------------------|------------------------|------------------------------------|-------------------------------------|
| Atmospheric Flooded | 6 | 33.4 | 2 | 9.6 | 1½-2 |
| Atmospheric | 25 | 8.0 | 2 | 40.0 | 2-3 |
| Double Pipe Flooded | 5 | 40.0 | 1½ & 2 | 44.5 | 1½-2 |
| Double Pipe | 8 | 25.0 | 1½ & 2 | 18.4 | 1½-2 |
| Shell & Tube Vertical | 12 | 16.7 | 2 | 19.2 | 2-3 |
| Shell & Tube Horizontal | 10 | 20.0 | 2 | 16.08 | 2-3 |
| Submerged | 35 | 5.7 | 1 & 2 | 56.2 | 4-7 |

$$\begin{aligned} \text{Gallons per min.} &= \frac{10.1 \text{ lbs.}}{8.33} = 1.21 \text{ gals. per min. per ton refrigeration.} \end{aligned}$$

H_g —The total heat in saturated gas at condenser pressure B.t.u. per lb.

H_h —The total heat in superheated gas in B.t.u. per lb. at final compression pressure plus superheat of compression.

h_l —Total heat in liquid B.t.u. per lb. at condenser pressure if saturated, or at liquid temperature if below the saturation point.

T_l —Absolute temperature of the liquid in receiver temp. F. plus 460.

T_s —Absolute temperature of saturated gas at head pressure.

T_h —Absolute temperature of gas at end of compression at head pressure temperature of gas degrees F. plus 460.

T_s —Absolute temperature of gas at suction pressure temperature F. plus 460.

P_c —Absolute head pressure of condenser pressure.

P_h —Absolute head pressure after compression. Same as condenser pressure.

P_s —Absolute pressure at suction or evaporator pressure.

t_g —Temperature of liquid or boiling point at condenser pressure.

t_c —Temperature of sub-cooled liquid at condenser pressure of the temperature of the liquid in receiver.

t_s —Temperature of saturated gas at condenser pressure.

t_h —Temperature degrees F. of superheated gas after compression.

t_1 —Temperature of water entering in degrees F.

t_2 —Temperature of water leaving condenser in degrees F.

W —Weight of water in pounds.

L —Latent heat of evaporation or of condensation in B.t.u.

C_p —Specific heat of gas at constant pressure for superheated gas.

C_l —Specific heat of the liquid refrigerant.

The temperature rise in the cooling water should be 10 to 15° F. This will

change with seasons and with weather conditions. The source of the cooling water supply will affect the water temperature. The above figures are only approximate and will change with every change in the conditions of operation.

Problem. The head pressure on system is 181 lbs. gauge or 169.2 lbs. absolute. The saturated gas is 86° F. and contains 631.5 B.t.u. per pound. The liquid at boiling point contains 138.9 B.t.u. per lb. Liquid sub-cooled 9° to 77° F. contains 128.5 B.t.u. per pound. The suction gas on evaporator coils is 19.6 lbs. gauge or 34.29 lbs. absolute. The saturated gas is 5° F. and contains 613.3 B.t.u. These are standard operating conditions for standard ton of refrigeration. The absolute temperature of saturated gas at head pressure is 546 degrees. The absolute temperature of suction gas is 465 degrees.

The temperature of the superheated gases leaving compressor after compression has taken place will be:

$$T_h = T_s \left[\frac{P_h}{P_s} \right]^{.231} = 465 \left[\frac{169.2}{34.27} \right]^{.231}$$

$$T_h = 465 (4.934)^{.231}$$

$$.69320 \times .231 = .160129$$

$$\text{The antilog for .160129 is 1.446.}$$

$$T_h = 465 \times 1.446 = 672.39^\circ \text{ absolute}$$

$$672.39 - 460 = 212.39^\circ \text{ F.}$$

The superheat content in this gas is:

$$212.39 - 86 = 126.39^\circ \text{ F. superheat}$$

The B.t.u. content in this gas is, per pound:

$$B.t.u. = C_p(t_h - t_c) + L + C_l(t_c - t_b)$$

$$B.t.u. = .52(212.39 - 86) + 565 + 128.5$$

$$B.t.u. = 65.72 + 565 + 128.5 = 759.22 \text{ B.t.u.}$$

The B.t.u. per pound that must be removed by condenser is:

$$B.t.u. = C_p(t_h - t_c) + L + C_l(t_c - t_b)$$

$$B.t.u. = .52(212.39 - 86) + 565 + 1.16(86 - 77)$$

$$= 65.72 + 565 + 10.4 = 641.12 \text{ B.t.u. per lb.}$$

Assume the following problem to illustrate the use of these formulas:

Problem. The head pressure on the system is 181 lbs. gauge. The suction pressure is 15 lbs. gauge pressure. The suction gases are assumed to be dry and saturated as coming from the evaporator. What is the temperature of the gas leaving the compressor?

How many B.t.u. per pound must be absorbed by the condensing water to condense the gas at 95° F.?

How many pounds of water per pound of NH₃ condensed with water entering at 70° and leaving at 95° F.?

How many gallons of water per minute per ton of refrigeration?

The head pressure of 181 lbs. gauge is 195.8 lbs. absolute and gives a saturated temperature of 95° F. and absolute temperature of 555° F. The suction pressure of 15 lbs. gauge is 30.42 lbs. absolute and gives a saturated temperature of 0° F. and absolute temperature of 460°.

The temperature of the superheated gases is:

$$T_h = T_s \left[\frac{P_h}{P_s} \right]^{.231} = 460 \left[\frac{195.8}{30.42} \right]^{.231} = 460(6.436)^{.231}$$

Horizontal Shell and Tube Condenser—Multipass Type

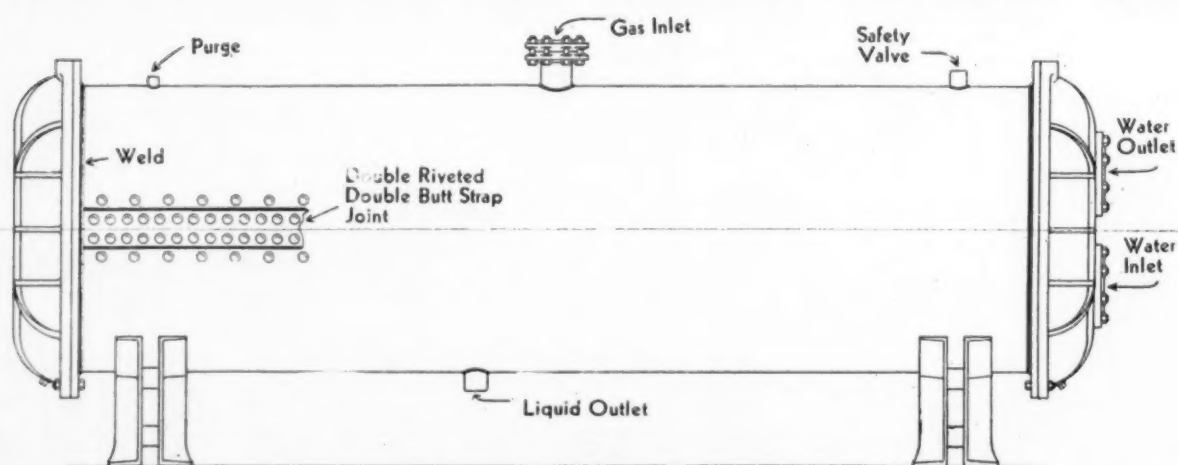
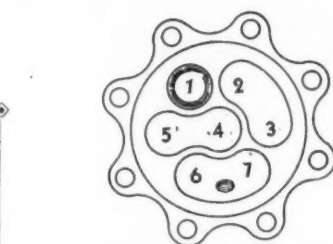


Fig. 54—Diagram of horizontal shell and tube condenser, multitube, multipass type. Baffles control the water flow.



The logarithm of 6.436 is .8086 and this multiplied by .231, the exponent of the fraction, gives .18678 which is the logarithm of 1.537.

$$T_h = 460 \times 1.537 = 708.02 \text{ absolute temperature of gas.}$$

$$708.02 - 460 = 248.02^\circ \text{ F. temp. of gases.}$$

The temperature of this gas at boiling point is 95° F. and contains 149.4 B.t.u. (See tables).

This represents 153° of superheat in the gases. By looking up this temperature in a superheated ammonia table, we can find that the heat contents per pound of NH₃ is 735 B.t.u. Then the heat removed by the condenser is:

$$B.t.u. \text{ per lb.} = H_g - h_l = 735 - 149.4 = 585.6 \text{ B.t.u. per lb.}$$

The number of pounds of condensing water required to remove this amount of heat from one pound of NH₃ is:

$$W = \frac{H_g - h_l}{t_2 - t_1} = \frac{735 - 149.4}{95 - 70} = \frac{585.6}{25}$$

$$23.3 \text{ lbs. water per lb. NH}_3$$

The number of pounds of condensing water per minute required to remove the heat from the NH₃ required for one ton of refrigeration.

The number of pounds of NH₃ required per ton is:

$$NH_3 = \frac{200 \text{ B.t.u.}}{H_g - h_l} = \frac{200}{611.8 - 149.4} = \frac{200}{462.4}$$

$$.433 \text{ lbs. NH}_3 \text{ per minute.}$$

$$W = .433 \left[\frac{H_g - h_l}{t_2 - t_1} \right] = .433 \times 23.3 =$$

$$10.1 \text{ lbs. water per minute.}$$

$$\text{Gallons per minute} = \frac{10.1 \text{ lbs.}}{8.33} = 1.21$$

$$\text{gals. per minute per ton refrigeration.}$$

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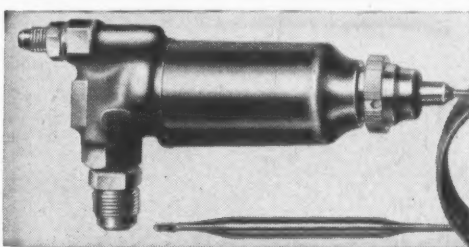
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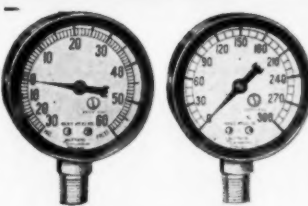
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Manufacturers Asked to Furnish Detailed Information on 1936 Household Models For Specifications Issue

The following questionnaire has been sent to all manufacturers of household electric refrigerators so that they can furnish complete data on their 1936 models for publication in the Specifications Issue of the News to appear soon. See announcement on Page 1.

Model No.

CABINET SPECIFICATIONS

Overall dimensions (in.)
Height
Width
Depth
Inside dimensions of liner (in.)
Height
Width
Depth
No. of doors

STORAGE CAPACITY

Net food storage (cu. ft.)
(Nema standard rating)
No. of shelves
Total shelf area (sq. ft.)

INSULATION

Top (Thickness in inches)
Sides
Back
Door
Bottom

ICE CUBE TRAYS

No. of shallow trays
No. of deep trays
Total number of cubes produced
Total weight of cubes (lbs.)

COMPRESSOR

Compressor Model No.
Ice melting effect per 24 hours
(A.S.R.E. rating)
Motor horsepower
Compressor speed (r.p.m.)
Compressor bore (in.)
Compressor stroke (in.)
No. of cylinders
Belt size (Cross-section and inside circumference)

PRICE

Retail price, installed
WEIGHT, net (lbs.)

CABINET MATERIALS

Make of cabinet
Material used for frame
Material used for breaker strip
Type or make of gasket
Make of insulation

FINISH

Cabinet finish (exterior)
Cabinet finish (interior)

HARDWARE

Make of hardware
Finish of hardware

COMPRESSOR

Make of compressor
Open or sealed
Rotary or reciprocating
Direct or belt drive
Type of shaft seal
Location of compressor

REFRIGERANT

Refrigerant used
Amount in system

LUBRICATION

Brand of compressor lubricant
Quantity in system
How often should motor be oiled

MOTOR

Make of motor
Type of motor

CONDENSER

Make of condenser
Method of cooling
(Fan or natural draft)
Type of condenser

EVAPORATOR

Make of evaporator
Evaporator construction
Metal used
Type of refrigerant control
Make of expansion valve
Ice tray special features
Material used in ice trays

CONTROL

Make of control
Model No. of control
Temperature or pressure
Adjustable or non-adjustable
Mounted inside or outside
Method of defrosting (manual, wide cycle semi-automatic, or automatic) *
Is vacation cycle provided?†

* "Manual" means that the motor is shut off by means of a switch on the control, and remains off until the user closes the circuit. "Wide Cycle" means that the user moves either the switch or temperature knob to the defrost position, whereby the cut-in temperature is raised to a value which permits defrosting. When defrosting is completed, the user returns the knob to the standard setting. "Semi-automatic" means that the user moves the knob on the control to the defrost position, raising the cut-in value to a temperature which permits defrosting. When this temperature is reached, the control mechanism will automatically return to the standard position. "Automatic" means that defrosting is taken care of by a mechanism which opens and closes the motor circuit for a definite length of time every day or every two days.

† "Vacation Cycle" means that the cut-in point is raised above the standard value, but is below the defrost value, the cut-out point remaining practically the same as on the standard setting.

POLICY

Guarantee on cabinet
Guarantee on system
Serviced by
Are replacement parts sold to independent service companies

SPECIAL FEATURES

Franklin Develops New Charging Connection

NEW YORK CITY—Franklin Machine Products Co. has put on the market a compact, light-weight gauge testing and charging connection for use by service men. The device weighs less than 8 ounces, exclusive of gauges, and was designed by D. R. Vanneman, sales engineer of the company.

Use of the testing and charging connection is said to give the service man full information on existing pressure in high and low sides while operating or charging the unit, and also make it possible to purge out of the system any air or excess charge without removing the gauges.

It is also said to simplify the adding of oil or the by-passing of gas from high to low side in making pressure tests for leaks.

Hickok Markets Tester For Appliances

CLEVELAND — Hickok Electrical Instrument Co. has placed on the market a new electrical appliance tester for use in testing refrigerators, washers, toasters, waffle irons, radios, and other household appliances.

The tester, principal use of which is in comparing actual wattage consumption with rated specifications, comes in three models, with watt ranges of from 0-300 to 0-1500 and amperage limits of from 2 to 10. Volt limit on standard models is 150, but testers can be supplied for 220 volt single phase, as well as in higher watt ranges with external resistors.

To Handle Ermstat Line

SAN FRANCISCO—California Refrigeration Co. of this city has been appointed distributor for model "B" Ermstat controls, reports George C. Tatem, sales manager of Ermstat Co.

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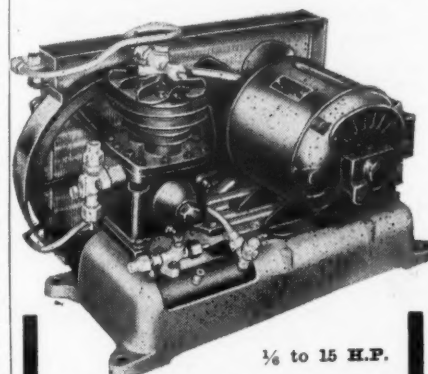
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